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PATRICK VAN SCHIE SAYS THE WEST MUST UNDERSTAND THAT POWER COUNTS IN INTERNATIONAL RELATIONS

AKGÜÇ *ET AL* OUTLINE LABOUR AND SOCIAL EFFECTS OF THE EU'S FIT FOR 55 CLIMATE PACKAGE

INFLATIONARY PRESSURES MEAN A FINANCIAL POLICY RESET IS NEEDED, ARGUES AGUSTÍN CARSTENS

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Doomed to decline?

Reality is a harsh mistress: remove fossil fuels and net zero has exposed Europe's 30 years of climate policy failures. Indeed, it is not just a European failure, it is the failure of the West. In complex, advanced economies, energy costs ultimately affect all downstream socio-economic activity. That unavoidable reality and the outcomes of deeply misguided climate policies are now staring G7 members (with the exception of Japan) in the face.

A fixation on renewables incapable of powering industrial economies and technologies that don't exist, a refusal to develop domestic fossil-fuel reserves such as shale gas, and a deep and irrational hostility to nuclear power has made the Russian invasion of Ukraine into a major energy crisis.

A growing number of people view net zero as either an incompetent policy or what has been phrased as the latest example of 'crisis capitalism', whereby crises are exploited by ruling elites to push through changes to the capitalist system — usually by concentrating power and capital in the hands of fewer and fewer people. Examples are with the 2008 financial crisis, with the pandemic, with the war in Ukraine, and with the climate crisis.

All this casts serious shadows over elites' claims of having the welfare of the electorates at heart. Rather than pretend that wind and solar energy (and more of it) are the solution to the energy crisis, they largely ignore the only existing technology that can help us rapidly phase out fossil fuels once and for all — without disrupting Western societies, and without denying the rest of the world the living standards they legitimately aspire to. Obviously this is nuclear energy.

James Hansen, the Nasa climate scientist whose 1988 Congressional testimony on climate change helped raise broad awareness of global warming, has pointed out nuclear is the only viable path that has been proposed for rapid global decarbonisation.

There is a malaise in the West currently, where ideological goals are pursued at the expense of the lower middle and working classes. Whether it's truckers in Canada, farmers in the Netherlands, oil and gas companies in the United States, ideology, not science or hard evidence, is dominating the agenda, gratifying the elites while impoverishing the working and middle classes.

Ultimately, there is a risk that climate policies will do to Europe what Marxism did to Latin America. A continent with all the conditions for widespread prosperity and a healthy environment will impoverish and ruin itself for ideological reasons.

It seems the political and financial elite's primary goal isn't remedying the climate crisis. After all, a solution to the crisis stands right in front of us. Faced with such deception, it's hardly surprising that many are starting to question their motives; and in more and more countries, are starting to let it be known that they have had enough. ■

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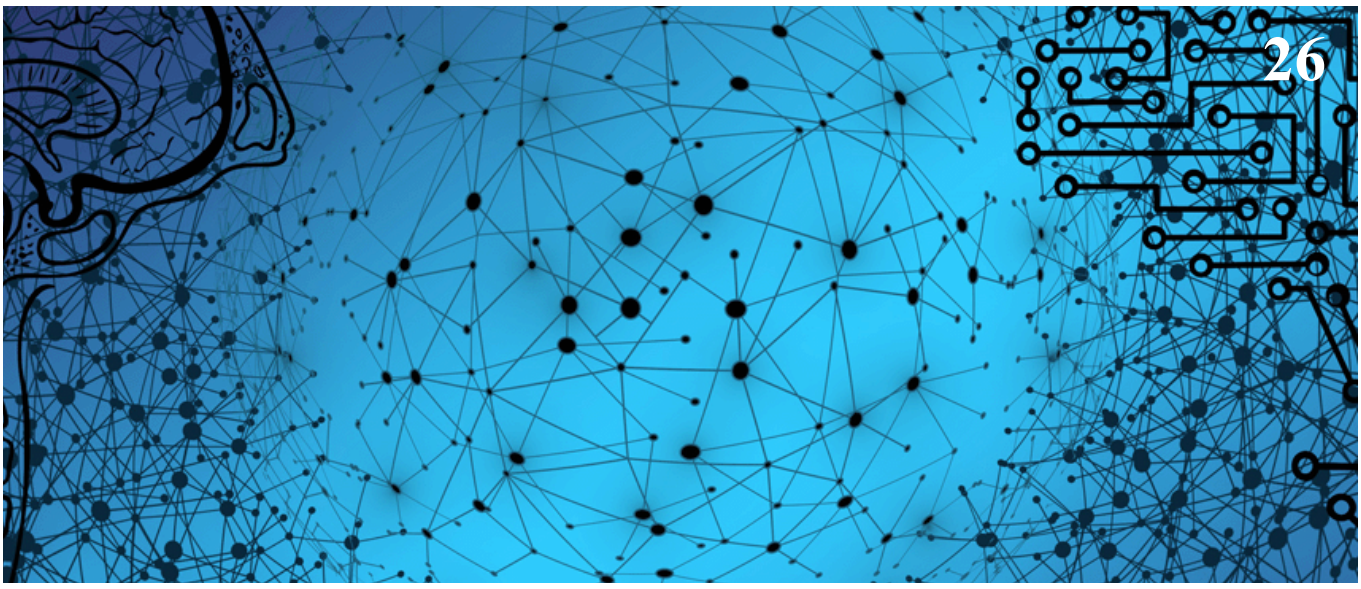

The West must learn to understand power politics

Patrick van Schie is the Director of TeldersStichting, the Netherlands' liberal think tank

The shock

The omens were clear: large-scale Russian 'exercises' without a defined end date on the Ukrainian border, troops deployed not only in Russia itself but also in its vassal state of Belarus near the Ukrainian capital Kyiv.

Even more alarming was the build-up of an excessive amount of military equipment, all in all ideally suited to the carrying out of an invasion. Add to this the denials from the Kremlin that any of this was happening.

At the same time, numerous Russian ships were arriving from other waters, including the Baltic, and converging in the Black Sea. American intelligence services predicted a Russian attack on Ukraine, but most of the government leaders in the West and countless experts dismissed the signs of jeopardy, and all expressed their shock when, on the 24th of February, Russia finally invaded Ukraine from the North, East and South.

Why were they so blind to the danger? For years, Putin had been clear on the subject. According to him, Ukraine was not a country but 'a region'; and a region that belonged to Russia at that.

Moreover, as the Kremlin had affirmed in official documents, Russia has the right to interfere in any country the population of which is partly Russian. Putin had already shown that he is willing to suit the action to the word, not least with the invasion in Georgia in 2008 and in eastern Ukraine and the Crimea in 2014. Nevertheless, at the beginning of this year most of those in the West thought that things would not turn out to be that bad.

How can this be explained? It was partly due to the kind of wishful thinking there has always been; it won't happen because we don't *want* it to happen. The prospect of catastrophe is simply too horrific. Think of the atmosphere in Europe for most of July 1914.

Not only were populations everywhere happily celebrating their holidays without a care in the world, and many Western government leaders could not imagine a large-scale war until well into July. Even halfway through the month, political leaders in London were still more actively concerned with the Irish issue than the potential consequences of the murder in Sarajevo of Franz Ferdinand, heir to the throne of the Austro-Hungarian empire.

There is also a parallel to be drawn with the recent COVID-19 pandemic. As the disaster unfolded in China, many Western governments seemed to be behaving as if their own populations possessed a natural immunity to the virus. It wasn't until mid-March that they woke up with a fright and started to panic...

Many countries blindly instituted lockdowns; after all, that's what many other countries were doing. Quite simply, most governments just didn't know what else to do.

The naivety

Wishful thinking, however, is only part of the explanation. In Western Europe in particular, the belief that power politics are old-fashioned has begun to prevail. Diplomatic consultation and right are the standard, and those few countries who chose not to adhere to this line are the exceptions that confirm the rule.

Typical of this way of thinking is the statement 'Putin lives in another world' made by German chancellor Angela Merkel in 2014.

It is not Putin, however, who is living in another world; the West is living in another world. Western leaders are trying to replace power as the decisive factor in mutual relations between countries with treaties and consultation (which incidentally often hide other ways of exercising power).

The belief in Western Europe is that European integration and international trade are automatic promoters of peace. Not only is that an overly optimistic assumption in itself, assuming that – apart from the odd exception – the rest of the world feels as you do, demonstrates a failure to understanding how other people think.

Much of the world continues to think in the terms that have determined international relations for centuries: in the end, it is power that counts. The powerful parties are those who are well prepared and effectively capable of deploying their military resources.

The fact that Western leaders have failed to realise that African leaders still think along those lines is one thing, although it does present an obstruction to the effective development of such countries. Quite another and more serious is the misconception that major international players such as China and Russia cannot see their way to evading Western standards in the international political arena.

It is this very misconception that accounts for the failure to understand that the military build-up of Russia and communist states like China does not have a defensive objective per se, but constitutes, for these countries, a weighty instrument to effectively enforce their demands. Or rather, to quote Von Clausewitz, that the Chinese and Russian armed forces are instruments with which to conduct politics using other resources.

The inability – and sometimes also unwillingness – in the West to actually explore the way of thinking which prevails elsewhere also makes many parties blind to what really counts for Xi Jinping and Putin. Clearly human lives are of no account.

It must already be obvious to anyone simply from studying their criminal regimes that these dictators couldn't care less about the lives and sorrows of other people. Why should Xi Jinping or Putin care about the fate of people elsewhere when they so ruthlessly suppress their own populations?

The fact that the Russian army in Ukraine deliberately attacks so many civilian targets is indeed shocking, but it should not surprise us.

Something else which is *not* ultimately of great importance in countries like Russia and China is the economy. It is therefore an illusion to think that Xi Jinping or Putin will shy away from certain actions because trade will suffer as a result.

Not only can the Russians and Chinese transfer their trade relations from the West to other regions – there are plenty of regimes willing to fill the gap – but above all, the economy is subordinate to politics in their eyes.

For them, trade is not exclusively an economic exchange, it is also a means of acquiring political clout. Moreover, economic interaction is actively used by the regimes in Beijing and Moscow to engage in espionage and to cheat, weaken and undermine the free world using digital resources.

Loss of trade and potential damage to the economy are totally acceptable to China and Russia if they are compensated by political gain, such as an extension of the territory under their control or an enhancement of prestige in their own country.

When it comes down to the nitty-gritty of the issue, trade, and economic and cultural relations in general, also constitute a continuation of politics using other means for such countries.

Actions rather than words

In reaction to the Russian invasion of Ukraine, most of the European NATO member states finally decided it was time to raise their defence expenditure to the level to which they had committed themselves eight years ago following the Russian annexation of Crimea in 2014: viz. 2% of their GDP.

"Preparation for war is not an obsolete idea. The purpose of this preparation is deterrence, but also, whenever required, the defence of a truly free democracy"

With the exception of a few countries, most European governments had remained convinced since the fall of the Berlin Wall that there could never again be a war on their continent, and so the 'peace dividend' of the post-Soviet era could continue to be cashed in.

In part, this boiled down to sponging on the American guarantee of safety (nothing new, because the 'burden sharing issue' had already prevailed at the time of the Cold War), but it also emanated partly from the sincere belief that Europe would, from that time, be safeguarded against a war of any significant scale.

In that context, the civil war in the former Yugoslavia was considered to be a convulsion from a past that Europe had in fact settled, for the most part.

Have the European countries now learned their lesson? The decision to substantially increase defence expenditure seems hopeful, but what really matters is whether the action will be suited to the word, and also whether it will be sustained. After all, the intention was already there in 2014, but intentions are of little value if they remain without consequences.

Moreover, the actual strengthening of Western defences is not merely a matter of money. Will the additional defence expenditure primarily be spent on higher salaries and pensions for armed forces personnel (which may definitely be necessary in some cases) or on a sufficient volume of new, effective military resources (including maintenance) and to improve operational proficiency?

It is gratifying that the Americans are expanding their military presence in Europe and that the rapid deployment force of NATO is being significantly reinforced. This also includes the storage depots in those Eastern European member states near Russia already holding military equipment that is readily available on the ground in the event of a serious crisis.

Nevertheless, this is still less than the Baltic States in particular have demanded. They are insisting on a 'forward defence', meaning the presence of sufficient troops from other NATO countries stationed on their territory as to represent such a deterrent that a Russian invasion of Estonia, Latvia or Lithuania would be virtually unthinkable – even for Putin.

As long as NATO troops are not present in the Baltic States in far greater numbers, there is a fair chance that the Russians could conquer these states, after which the NATO response

would have to be focused on regaining territory rather than defence, inevitably leading to the misery of a war waged on Baltic soil.

Thoughtlessness

In the immediate aftermath of the brutal Russian invasion of Ukraine, that country has enjoyed a huge wave of sympathy in Western Europe. This is understandable, but since then, many European governments have continued to allow their attitude towards the country to be dominated by that sentiment, which is not sensible.

Ursula von der Leyen, President of the European Commission, almost immediately offered EU membership to Ukraine. This has since been agreed by the member states, so Ukraine now has a real prospect of becoming a member of the EU.

Admittedly, candidate membership does not guarantee that Ukraine will be admitted in the near future. The question remains as to whether or not the obstacles to membership remain too high to be overcome, and whether or not the EU can stomach Ukrainian membership.

The battle between Russia and Ukraine is generally represented as a struggle between dictatorship and democracy. It is beyond any reasonable doubt that Russia has developed into a dictatorship in all respects. Then again, some very rose-tinted spectacles are required to perceive Ukraine as a full democracy.

The Democracy Index of The Economist, an objective method of classifying countries published two weeks before the invasion, denoted Ukraine as a 'hybrid' regime. This means that the country features a mixture of democratic and authoritarian characteristics.

For many, the hope is that things may well change for the better, but compared to ten years ago, Ukraine has gone in a negative direction on the Democracy Index.

Added to this is the fact that the country is in 122nd position on the Transparency International's Corruption Perceptions Index, hovering between Sierra Leone and Zambia, and ranked only 14 positions above Russia itself.

Objectively, for these reasons alone Ukraine has a very long way to go before it will be able to meet the basic conditions for EU membership. Furthermore, there is no reason to assume that the direction of travel will automatically be positive. Ukraine does not have a history of democracy and good governance.

Sad though it is, the fact that the country is now at war is not going to make a move in the right direction any easier. This means that full membership will either have to wait for many decades, which will cause bitterness in Ukraine, or that the EU will have to relax its minimum conditions, as a consequence of which an unfit country could become a member. The latter option would not be to the benefit of the EU's stability.

Ukraine is a poverty-stricken country. In view of the size of the country, this will constitute a heavy additional financial burden for the EU. In this respect too, the war can only make the situation worse rather than better.

Other than that, the conflict will have to be settled before Ukraine can become a member; this will entail more than just an armistice. It is hard to imagine how a sustainable peace between Ukraine and Russia can be realised in such a way that neither one of the two parties will want to retaliate.

Bear in mind that Putin is definitely not the only one in Russia who thinks that Ukraine is not entitled to an autonomous existence.

NATO and the EU are avoiding a direct confrontation with Russia, and rightly so. Why would we risk the disaster of a nuclear war with Russia now when we failed to come to the aid of the Hungarians when they craved freedom for their country in 1956, the Czechoslovakians in 1968 and the Poles in 1980-81?

Is it fully understood what Ukrainian membership of the EU would mean in terms of security? Section 42, paragraph 7 of the EU treaty stipulates that a member state that is attacked by force of arms must be assisted by the other member states using any resources that are available to them.

In other words, once Ukraine is an EU member, any new Russian attack would mean that the entire EU was automatically at war with Russia. Are we really ready to risk an automatic world war in the future when we are not prepared to do so in the current situation?

Would the majority of EU residents go along with that? Do they realise that an EU membership for Ukraine entails this risk? Do the government leaders within the EU realise this?

Or are rational politics based on national interests being superseded here by a rash sentimental gesture?

Learning lessons

The above does not mean that we must shy away from the risk of war under all circumstances. If we were to do that, we would give free reign to aggressive dictatorial regimes.

Western politicians must learn to understand the way of thinking that still prevails in large parts of the world, especially in major powers such as China and Russia.

Understanding what motivates those in power in such countries by no means implies acceptance of what they claim. Such an understanding is, however, a condition of being able to resist their claims to power.

This starts with the realisation that, for countries such as Russia and communist China, the economy is subordinate to political claims to power.

Furthermore, the 'language' that they understand best of all is that of military power. They see the Western propensity to neglect this as a weakness. They also believe that we in the West are not prepared to deploy our military power and suffer major losses.

We must demonstrate our readiness to protect fully fledged, stable liberal-democratic countries. This means credible military deterrents and – should these fail – concrete military assistance.

Obviously, this applies first and foremost to all NATO member states. The task of military defence must be taken seriously, and increasing defence expenditure to 2% of GDP is a minimum prerequisite.

Preparation for war is not an obsolete idea; it is, and will unfortunately remain, a dire necessity, even in the 21st century. The purpose of this preparation is deterrence, but also, whenever required, the defence of a truly free democracy.

Taiwan, ranked number 8 on the Democracy Index, is just such a stable liberal democracy. The country is not recognised by communist China.

China has invested substantially in the build-up of a modern military apparatus of power, and not without reason; Beijing is also using this apparatus for the systematic intimidation of Taiwan, as it has recently demonstrated with its extensive and threatening military 'exercises'.

Moreover, Xi Jinping has publicly announced that he wants to accomplish 'reunification' within one generation. We shouldn't be oblivious to these omens. Neither should we look away from the danger because we do not want to jeopardise our trade interests in communist China.

There are higher values, such as the defence – if necessary – of a stable free democracy. Taiwan is much more deserving of our full military support than is Ukraine. ■


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Code of coercion

Filip Medunic is Programme Coordinator, European Power programme, at the European Council on Foreign Relations (ECFR)

The idea of forming an alliance for sanctions akin to NATO[1] has been floating around for a while[2]. But it has never had as good an opportunity to gain traction as it does now[3]. G7 countries are experiencing an unprecedented moment of unity and, with surprising swiftness, have imposed the strongest ever economic sanctions regime on Russia.

European leaders and commentators are right to acknowledge the importance of coordinated economic measures. But NATO and its collective defence commitment is not quite the right analogy for future geo-economic policies. The EU instead needs a sanctions doctrine – a framework to set out the goals, means, and risks for the use of economic measures.

There is no sign that economic measures for policy objectives (economic coercion or warfare) will be used less in the future and the world has entered a period that will define the next global trade order. The EU should act to shape this order before it is drawn deeper into the vortex of economic warfare.

Impact and effectiveness of economic sanctions are not fully understood and require continuous research. There is good reason to remain cautious on the application of tools of economic coercion for strategic reasons (do they have the intended political impact?) and ethical reasons (do they harm the intended target or others?).

Nonetheless, European policymakers have compelling reasons to codify rules on when and why they resort to economic sanctions. These measures have become much more than a tool for limited coercion or for signalling disapproval of a certain policy.

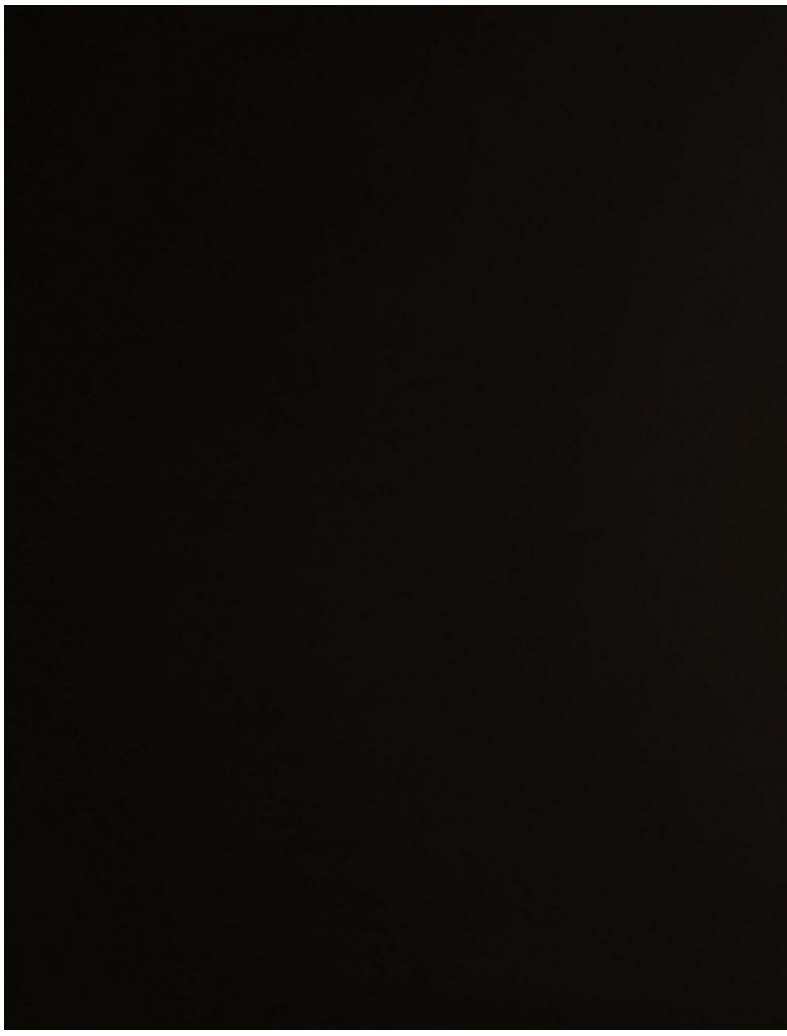
Sanctions now often define the rules of engagement with the global financial system – and they may have the same effect on trade. But greater restrictions on the global financial and trade order could contribute to long-term instability unless policymakers have a common understanding of the purpose of these measures and the risks they involve.

According to most estimates, sanctions achieve some of their objectives between 30 per cent and 40 per cent[4] of the time (although this depends on various conditions[5]).

The EU needs a sanctions doctrine. This is the only way to prevent open societies and economies that are dependent on free trade from eroding the environment they have benefited from for so long – and from imposing increasing costs on others[6]. It should define the goals, capabilities, and thresholds for applying sanctions, as well as techniques for lifting them.

Goals

The difference in assessing success depends on the question asked: are the economics measures having an effect? Or: are



the political objectives reached? For the second question these political objectives need to be defined as well. When sanctions are used as a tool 'to do something' then there is barely a coherent answer to this question.

There are nonetheless several political objectives that can be clustered roughly into different categories according to the likelihood of them being realized.

For instance, pressuring an actor into negotiations to resolve a non-violent border dispute is more realistic than ending military aggression to defend abstract national ideas or a regime. In the same way it has been proven several times that regime change is not an objective that can and should be the goal of sanctions.

There are, however, limited objectives that can help defuse military conflict or oppression if they are incorporated into a larger strategy encompassing more tools than only economic sanctions. Most importantly, they need a clear path towards being lifted and the possibility for the private sector to re-engage with a once sanctioned actor.

Therefore, policy makers and the private sector need to continue in a much deeper way the discussion about what the policy objectives can be on the one hand, and what the economic measures are on the other hand.

Capabilities

A sanctions doctrine should define the different measures the Union has at its disposal, coupled with an assessment of their consequences for the EU and for the target. This would necessarily involve the private sector as well, which in the end implements most economic measures, with the exemption of central bank asset freezes or visa restrictions for example.

Private sector actors might face implementation difficulties due to insufficient personnel or clear enough regulations, but they might also be able to point to secondary consequences further down the line, that on a political level ought to be avoided. It is necessary to involve the private sector in the design of measures to understand their consequences. It might also pre-empt cases of implementation failure and close loopholes.

If sanctions are applied by a large group of actors, they are more efficient, as evasion is more difficult. It is however paramount that those 'on board' see a real benefit in these measures and perceive the application of economic coercion as a legitimate tool.

If actors are on the other hand feeling that the measures only work to some interests and might even erode some of their own welfare benefits, coalitions will be hard to find or weak in their resolve.

"A sanctions doctrine would improve the European Union's policymaking process and provide its global partners with clarity about the measures it would implement in certain conditions"

Political resolve is driving sanctions policy, and often the desire to act outweighs the probability of success, which itself is hard measure. In the public sphere it is a question of communicating the objectives and means to reach them. Communication should be careful in not announcing objectives that are not reachable.

Thresholds

When sanctions are decided they have in most cases an effect on the economy of the implementing state and on the perception of the measures in its society. A threshold approach could help to avoid unpopular or counterproductive measures.

It cannot be defined without the goal and needs an assessment of the probability of success of the economic measure in question. This could include the costs for the implementing economy, the costs for the targeted economy and the political goal that is connected to the measures.

Lifting sanctions

If sanctions cannot be lifted it will be priced into any strategy by international actors. If they are a tool to add pressure to negotiate certain relationships, there needs to be the real prospect for lifting.

If they are set to demand unrealistic goals, they serve as a punishment - which deteriorates their acceptance and can also increase resolve by the targeted actor. It can even lead societies in targeted states to rally in support against such measures, especially if non-elites bear the bulk of the domestic costs for the targeted economy.

Although this issue is sometimes quietly ignored in assessments of coercive economic measures, sanctions can have a severe impact on civilians[7] in the long term[8] without achieving any of the intended policy outcomes.

A sanctions doctrine would improve the European Union's policymaking process and provide its global partners with clarity about the measures it would implement in certain conditions. Like a military doctrine, it could help prevent escalation.

A doctrine can also help in providing more buy-in from EU member states. The G7 has become a prominent forum for coordinating and announcing Western punitive economic measures, especially with regards to Russia. But G7 countries do not share a single market, and only a few EU member states are full members.

Defining a doctrine at EU level could help a more coherent EU decision making and even pre-empt some of the lengthy discussions on capacity of implementation on member state level.

The exercise could also help to continue the discussion between member states and the European private sector, which at the end will be at the forefront of implementation of many measures.

The union is currently debating an anti-coercion instrument, which would be the world's first such measure for collective economic deterrence. Therefore, the EU is already much further along in the process of institutionalising its approach to economic retaliation than any other state or group of states.

The public debate on the instrument shows that the issue of when to apply it is highly complex – and that, at the moment, this is only at the EU level and purely for deterrence.

As such, before attempting to resolve any international problem by sanctions, the EU will first need to clarify its own sanctions goals and honestly assess the potential and limitations of sanctions in a broader doctrine.

The EU's internal market, technological strength, and commitment to open trade mean that it has huge geopolitical potential. But the union will need to understand the strengths and weaknesses of economic measures before it can fulfil this potential on a global scale. ■

Endnotes

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The climate of trade

Dr Graham Bright is Head – Compliance & Operations, at Euro Exim Bank

The British are obsessed with the blame game. Usual issues with the cost of food, electricity and gas (blaming profiteering energy companies and the Government), airport queues and cancellations (blaming COVID and non-returning staff) and disrupted channel crossings (blaming the French).

But no one can be blamed for the internationally experienced extended period of record-breaking weather, leading to wildfires, floods, loss of life and property, buckled railway tracks, airport runway damage, iPads and mobiles overheating.

Add to this the ongoing problems in world trade of rising tariffs, volume and proliferation of counterfeit goods, intellectual property theft and increasing difficulty in getting redress, and individual governments appearing more protectionist than ever.

However insular or protectionist a country may wish to be, there is no escaping globalisation, with growing interdependence of the world's economies, cultures, and populations.

But the positive trend for international trade may soon come to an end amid tightening policies and geopolitical frictions.

Dramatic rises in crossborder trade in goods and services, technology, and flows of investment, people, and information, integration of international financial markets and the coordination of financial exchange have contributed to global trade hitting a record $7.7 trillion in first quarter of 2022.

More business is good news, but the continued upward trend for international trade may soon be compromised by tightening policies and geopolitical frictions.

Ultimately, international trade needs collaboration and friends. Especially in these times of global supply chain disruption, first caused through the COVID pandemic, then with deep implications from geopolitical influences such as the Ukraine/Russia conflict and worries of long-term dependence on China.

Finding more trusted friendly trade partners these days or 'friend-shoring' has re-emerged as a strategic policy, even

endorsed by the current US administration, to spread risk through diversification, and attempting to minimise the dramatic effects of price increases and economic disruption.

Free Trade Agreements

Conversely to implementing harsh tariffs, there is renewed interest in Free Trade Agreements – FTAs.

Hundreds currently exist, covering bilateral agreements with immediate neighbours, to regions, such as the Gulf Co-operation Council (GCC), to large cross-continent multilateral agreements such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) between 11 countries, and the cross-continent AfCFTA, the world's largest trading area since the establishment of the World Trade Organization with 54 of the 55 countries of the African Union (AU).

The FTA will encourage elimination of trade barriers, provide an economic boost to smaller companies, encourage industrialisation, promote Africa as a powerhouse for alternative supply chain resources, and encourage independent financing and development.

And, further news shows good progress with India and Africa talking to engage in another FTA, namely the Comprehensive Economic Partnership, to cover solar power with clean energy, energy security, jobs to Africa, defence trade, physical and digital infrastructure, and co-creating a start-up ecosystem.

Unexpected consequences of climate change

The location and ongoing sustainability of various traditional industries may be under threat.

Take the global wine industry, with a market size of over US$400 billion in 2020, employing almost one million people, a major attractor of seasonal labour and economic contributor to over 70 countries. Whilst Italy remains top producer, over 85% of all wines are produced by 28 countries.

"Whilst we think today of trade wars creating economic restrictions to force change of policy, they have been implemented many times in the past"

Looking at the globe, traditional growing regions for wine are found between 20 and 30 degrees latitude in both the northern and southern hemispheres. However, rising temperatures are causing a significant shift as some wine regions expand and others slowly migrate or even shut down, to the point where there will be a redrawing of the world's wine regions.

I have personally witnessed temperatures of 44 degrees plus in Portugal and Spain, where entire harvests are ruined as grapes boil on the vine. But there are steps being taken to find and invest in new varieties less susceptible to heat and more resistant to rot, to meet the challenge of new regions taking advantage of favourable growing conditions.

Remarkably, England is the latest prize-winning area for white wines and Champagne, and fine wines are available from as far afield as Japan, Cuba, Ireland and Jordan.

Trade wars are not new

Whilst we think today of trade wars creating economic restrictions to force change of policy, they have been implemented many times in the past. And hard to believe previous 'wars' were fought over such goods as pasta, laptops, bananas, tea, opium, chicken and steel.

We may all recall the Boston Tea Party as one of the first trade wars in 1773, but subsequent initiatives were doomed to failure, such as the Embargo Act of 1807 where all goods from Britain were embargoed by the USA. With no other source of supply, prices rose domestically, and shortages were rife.

Another notable failure was during the 1928 Presidency of Herbert Hoover, attempting to help farmers by increasing tariffs on all agricultural products and protecting jobs from foreign competition.

The effect was devastating for the wrong reasons, as each former trading partner increased prices of staple products by 67%, making it uneconomic for the US to export and costly to import, all at the time of the Great Depression.

Tariffs were also responsible for The Chicken War of 1962, where US production methods had reduced prices, the EU raised tariffs to protect its local producers.

Imports from the US fell by 64%, so the US targeted tariffs on multiple industries, such as trucks to hit West German automakers like Volkswagen, brandy to impact French producers, and potato starch to damage Dutch potato farmers.

History shows that there were some benefits derived, across other industries. New assembly methods in the US allowed automakers to avoid automobile import tariffs, including the practice of sourcing parts from abroad and assembling them onshore to count as 'Made in America'.

Environmental effect on shipping

About 90 per cent of the world's trade is transported by ship. With rates on the increase, China's zero-COVID policy has led to a roster system for port workers, with only half working at any one time and confined to the port, while the others are off.

However, if any infection spreads through the terminals it leads to closure, causing even greater delays, with lower handling capacity and longer waiting times for vessels at their berths.

Demand has increased for certain goods like home office supplies and electronics, many of which are made in China and other manufacturing hubs in Asia. But ports like Shanghai are still operating at low capacity, hit by worker isolation through COVID with inevitable longer loading/unloading times.

This timing and manning issue has further manifest itself in revenue of shipping lines, which are making huge profits from massive demand, amid fierce competition for space on container ships.

But there is yet another factor that has recently come to play. Companies are stating their claims regarding green credentials, but unsure given current market conditions, on when and how they will fully comply and achieve their ESG goals.

One consequence is that many shipping firms are not immediately investing in newer larger vessels but using less efficient older vessels. The drawback? Complex rules on emissions may mean they have to sail slower else face penalties.

Conclusion

Finally, as we look at how the world is managing its energy, pricing and resource challenges and pledges towards zero emissions, there is a new race, namely for minerals and critical raw materials.

Wind turbines need copper, and lots of it, to move their generated electricity to substations or national grids for further distribution to houses and industry. Copper demand from green energy will grow six-fold between now and 2030 - or nine-fold if we move even faster to adopt green technologies.

The demand for mobile phones is unabating, with an exponential demand for lithium, the underlying more effective metal found in all rechargeable batteries. Again, insatiable demand for lithium could rise by a factor of 40 in the coming years.

With the worlds' major source of supply for these precious commodities found in Chile, care will be needed in managing the extraction process, its global pricing and environmental impact.

We only have ourselves to blame if demand outstrips supply to the point of total depletion and cause environmental disaster along the way. ■

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Reforming British economic policy

Patrick Minford is Professor of Applied Economics at Cardiff University

Economic policy in Britain is at a crossroads. The change of leader creates an opportunity to reform inherited policies which I argue in this article are set to create economic disaster. Fortunately, Liz Truss is pledged to grasp this opportunity, very much in the way I will argue is needed.

The current outlook under scheduled policies

Under current policies the UK economy was drifting into a bad economic future in which the gradual defeat of inflation by higher interest rates and reversing commodity prices would be marred by a nasty recession and substantially lower growth in the long term.

Policy on taxes and the budget were scheduled to deliver rising corporate tax rates and have already raised tax rates on wages (via higher National Insurance Contributions, NICs, and via higher income tax rates as inflation pushes people up the tax scale).

According to much modern work on incentives to innovate and so stimulate productivity, growth depends on an environment where entrepreneurial incentives are high and so tax rates and regulative barriers are low - modern thinking on 'endogenous growth'.

In our models of UK growth, the raising of corporation tax to 25% will lower growth by about 2.5% pa; on top of that the rise in NICs lowers competitiveness and also depresses output. In our baseline forecast without all this growth is projected at 2%. Reducing it by this much implies actual decline.

The rise in taxes was intended to strengthen the public finances and bring down the debt ratio. Ironically by destroying growth it does the opposite. My Cardiff research team has projected long-term debt according to the effects of these taxes on growth and so on tax revenues net of benefits, where spending is kept on its present trajectory[1].

The result is that the debt ratio spirals upward, reaching 125% by 2035. What this illustrates is the Treasury's intellectual error in neglecting the effect of its policies on growth.

In principle, if uncorrected, it could react to this evolving scenario by raising taxes even further to restore the finances. But this would worsen matters further, creating a 'doom loop' in which events and policies interact to destroy both the economy and the finances.

As for inflation, if this continuing recession were to cause a sharp loosening of monetary policy in a forlorn attempt to restore growth, we could also face a worsening inflation outlook. What we see is that the policy orthodoxy enshrined in the Treasury's policies as planned by the previous government would have been likely to produce very poor economic prospects for the UK economy. This is what needs to change.

How to change the approach - moving to long-term rules

The pity of all this self-harm in taxation is that it is entirely unnecessary, an 'unforced error', inflicted by the UK Treasury failure to understand the role of debt management.

This Treasury view has been that debt contracted during COVID should now be repaid as soon as possible, as a priority, and hence that any new spending must be met from new taxes. However, this view is quite wrong and at variance with welfare-maximising debt policy.

The reason is not rocket science. To maximise welfare, tax rates should be set to maximise growth over the long run. This means, because higher tax rates reduce growth, they should be kept constant at the lowest rate the government can afford over the long term, which means equal to long run expected spending.

This in turn is equal to long run spending on goods and services plus debt interest. As for short term fluctuations in spending and debt interest these should be paid for by borrowing which consequently 'smooths' out the need for tax rises - much like households or businesses use borrowing to allow them to keep their consumption or investment spending constant.

It is incomprehensible that the Treasury threw over this basic economics. A more forceful Chancellor than Rishi Sunak, who has proclaimed that he is a 'low tax supporter', would have overruled officials on this.

Instead, he gave way to Treasury insistence on 'balancing the books' short term with tax rises. Boris Johnson went along with this, in spite of strong opposition from his backbenches. As a

result he and his Chancellor threatened to kill off economic growth just when post-COVID and post-Brexit we most need it to boost confidence in the economy's future.

There are those who are uncomfortable with a public debt ratio to GDP well above the 50% or so to which we became accustomed before the financial crisis and COVID. Of course, over the long term such a ratio must be brought down to the comfort zone.

But the way to do this is not to sabotage growth but to allow growth gradually to bring it down over time by raising revenue and lowering the need for benefits.

In our baseline forecast my Cardiff team show, using our model of the economy, that leaving our growth rate at a trend rate of 2%, achievable without the sabotage created by scheduled tax rises, the debt ratio steadily falls to around 50% by 2035. It does so in the time-honoured fashion, in which growth raises net tax revenues steadily.

This Treasury idea that borrowing is a bad thing goes back a long way, especially in Conservative circles after all the battles over the tough 1981 budget under Mrs Thatcher.

But the world has changed radically since then. Inflation then reached 25%, today it has been close to or at 2% for most of the last three decades. Unions, mighty then, are today weak and controlled by tough union laws.

In 1981, the government controlled both debt and money and markets were afraid it had lost control of both; to bring inflation down it had to convince them with that tough budget.

Today the Bank controls money; its current tightening will bring inflation down which allows the government freedom to use the budget to support the economy.

Finally interest rates today, the cost of borrowing, are close to zero, whereas in 1981 they were well into double digits. Real interest rates today are negative, which means the Treasury is actually being paid to borrow. The Treasury has resisted all advice to reissue as much debt as possible at today's negative real rates; why look such a gift horse in the mouth?

Table 1. UK growth by decades (eg. 1970s=Q1 1970 to Q1 1980)

Decade	Growth rate
1970s	2.5
1980s	2.8
1990s	2.3
2000s	1.6
2010s	1.7

Source: Fed of St Louis databank, FRED.

"Post-Brexit and post-COVID there are major challenges for government policy; the recovery needs to be sustained, and policies must be put in place for solid long-term growth and levelling-up"

Government borrowing today should optimally support the real economy by keeping taxes down, growing output and productivity and tempering wage costs. Furthermore, it should aim to go further and actually cut taxes, not merely cancel the planned and recent increases, to boost growth further. I discuss this further below in the next section.

The Treasury likes to parade its scepticism that the tax and regulative environment is crucial to growth; for it, growth is 'exogenous', and falls or not like manna from heaven.

There is strong evidence that a free market approach to cutting taxes and regulation on entrepreneurs has been successful here in the decades since 1970, confirming that UK growth has indeed been 'endogenous' - ie. policy-dependent - once you allow for all the shocks that have buffeted the economy over the period.

We have estimated and tested a full regional model of the economy in which growth due to all relevant factors depends on tax and regulation; it matches the UK economy's behaviour well - the table of decadal growth suggests why: growth surged in the 1980s as the Thatcher reforms took hold.

As one side implication, it finds that the North responds more to a policy of cutting tax and regulation than the South- see next section for more details. Hence it provides strong evidential support for a policy of not merely keeping taxes down but actually cutting them further.

A longer-term programme for stimulating growth

The economy is now recovering from the pandemic, after the collapse of 2021 and the resulting run-up in public debt to pay for the emergency. Post-Brexit and post-COVID there are major challenges for government policy; the recovery needs to be sustained, and policies must be put in place for solid long-term growth and levelling-up.

This policy formulation requires the government to take a long-term view, as we have seen, and not to panic in the face of short-term pressures.

Table 2. A fiscal stimulus package costing £100 billion pa.

Tax cuts	Amount
Cut corporation tax by 10%	£32 billion
Abolish the very top additional 5% rate	£1 billion
Cut the top rate of income tax to 30%	£15 billion
Cut the standard rate of income tax by 5%	£28 billion
Total tax cuts[1]	£76 billion
Public spending[2]	£24 billion
Total Package	£100 billion

Notes: 1. Representing a weighted average tax cut across all income of about 15%. 2. On public services and infrastructure.

Table 3. Effects on growth in Regional Model (% of GDP over next decade) from full policy package of £100 billion pa.

Percentage change in	GDP_N	GDP_S	GDP
Cut standard rate of income tax or VAT or other general income/consumption tax	3.3	1.5	
Cut corporation tax rate	2.4	1.2	
Cut marginal tax rate and regulative burden on entrepreneurs/SMEs	20	17	
Increase infrastructure spending in the North	3.8	-	
Total	29.5	19.2	24.4

What this implies is that having reversed the scheduled tax rises, we need to do more to stimulate growth further. It is generally agreed that our inherited EU regulation needs urgently to be liberalised and replaced with the environment of the common law where people's rights are protected by the ordinary criminal law and the civil laws of contract and tort.

With this back in place, the need for bevies of regulators and long complicated regulations forbidding swathes of actions is removed, as recommended in the TIGGR report of the Task Force under Sir Ian Duncan Smith[2].

However, in addition we need to reinforce our growth environment with a programme of actual tax cuts, not merely the reversal of scheduled tax rises.

Such policies will also generate 'levelling-up' where growth in the North exceeds that in the South- we define the South as consisting of London, the South East and the South West and the 'North' as all other regions (with apologies to Wales, the Midlands and the east).

The new Cardiff regional model of the UK is designed to frame the best way for policy to address this agenda. Our work[3] produces the policy results shown in Table 3.

The model is based on well-known and well-tried ideas of supply-side channels through which targeted tax cuts and regulative reform raise entrepreneurial incentives to innovate as well as creating labour market flexibility and lowering labour costs.

Previous work has shown that these sorts of policy have worked well in the UK to boost the economy in the 1980s and 1990s. Much policy commentary has criticised the government for aiming at 'levelling-up' without any strategy for achieving it.

We show here that there is a potential strategy that is feasible without affecting public sector solvency; also that it 'levels up' the North without cutting down the South - all boats rise in this strategy.

The policy package we propose below will, according to the Cardiff model, raise growth by 2.4% per annum, that is to 4.4% against the 2% baseline assumption. It will also raise growth in the North faster than that in the South, so achieving levelling-up in a way that raises all boats.

The projections for the public finances under this scenario not surprisingly show that, with this growth trajectory, tax revenues surge, pushing the debt ratio down rapidly, providing

spare resources for yet further tax cuts, in a virtuous circle, the mirror-image of the doom loop set up by rising taxes.

How short-term economic management of the economy needs to change

The above 'Treasury Orthodoxy' maintains that the restraint of government borrowing is the key priority for the government. Yet in truth public debt is simply another and an important instrument of policy to achieve the overriding aim of a prosperous economy.

To achieve growth, as I have just argued, we need a policy of reducing taxes and improving regulation in a new reform of 'supply-side' policy; this will improve business innovation and so productivity growth, and will also promote levelling-up, as the north responds most due to having more spare resources.

To enable it, there has to be government borrowing to finance any temporary excesses of spending over tax revenues as shocks like the business cycle hit the economy.

This 'tax-smoothing' function of borrowing merely has to be consistent with the long run constraint that the debt ratio must come down again to a safe level of around 50%, with spending matching tax in the long run.

But short run fiscal rules of the various sorts that have been used from time to time obstruct the vital tax-smoothing function of debt and borrowing. So much we have already seen above. We have also shown that a bold supply-side reform programme that includes tax cuts is entirely consistent with long term public solvency, with the debt ratio coming down steadily to safe long-term levels.

But there is more than such a supply-side agenda to 'fiscal policy', in the form of the effects on demand in the economy from the current balance of government spending minus revenue - the 'fiscal deficit' for short.

What I also propose is that this should stabilise output, going up when recession threatens and down in booms. At the present

time when rising interest rates threaten a recession, this implies fiscal policy should support demand and avert a recession.

Meanwhile monetary policy has the job of controlling inflation, mainly by moving interest rates around but also by directly printing/reducing money through buying/selling market-held bonds.

Currently, with inflation close to double digits, the Bank of England is raising interest rates. It is having to decide continuously how far to raise them to get inflation back down to its 2% target; accordingly we can describe its behaviour as a rule by which money tightening responds to inflation and output.

What my Cardiff research team's work on modern economies has told us is that the most successful policies for stabilising inflation, output and interest rates are a combination of a fairly tough monetary policy reaction rule and a fiscal policy that stabilises output.

This is because then people and firms know that inflation will not be tolerated, so they act to restrain their wages and prices; but they also know that recession will be avoided so they keep on spending in a way that keeps growth on course.

Finally, because this stops inflation from rising too much and also stops output from slumping, this also keeps interest rates stable - with the Bank not needing to raise them too much when inflation shocks hit and not being pressured to lower them to zero as it did (with bad side-effects on saving and the survival of zombie firms) after the financial crisis.

In other words, using the instrument of fiscal policy side by side with a monetary policy to control inflation ensures a generally stable economy - implying stability in all of inflation, output and interest rates.

This is why it is nonsense to say, as so many orthodox economists today have said, that for fiscal policy to support the economy now is inflationary and pushes up interest rates.

The opposite is true: by reinforcing the Bank's freedom to get on top of inflation, it contributes to both lower inflation and lower interest rates.

What the orthodoxy asserts is a naïve simplification of the economy's workings which omits the way private expectations and responses interact with policy rules- this is a key element in modern models of the economy.

What the orthodox see is just the direct effect of fiscal expansion on demand and inflation, and the assumed direct offsetting effect of interest rates needing to be raised by the Bank. However, this leaves out the vital reactions of expectations to the policy rules.

People see that the Bank is now freer to raise interest rates due to the recession being prevented by fiscal policy. This reinforces the Bank's credibility in the control of inflation, which in turn restrains people's inflationary reactions and so reduces inflation, without the Bank having to raise rates by more.

It is a bit like the general putting his army with its back to a river knowing the enemy will fear it more and so will fight less enthusiastically.

The failure of the UK Treasury to understand these ideas needs to be remedied by Whitehall reforms. It should not be necessary for ministers to have to import teams of outside advisers to remedy Whitehall failings and resulting obstinacy.

Admittedly the government to date has failed miserably even to have good enough teams of advisers to get policy right, let alone ones capable of remedying Whitehall obstructionism.

As part of the Whitehall reforms, there also needs to be a review of what went wrong in detail in the Bank and Treasury policy processes that permitted double digit inflation to take hold this year; while this is unlikely to recommend changing the Bank's independent mandate to control monetary policy, there may well be areas where practices can be improved.

This Whitehall situation has occurred before. When Mrs Thatcher embarked on her 1980s monetarism and supply-side reform programme, it was widely opposed and misunderstood by the senior civil service.

To carry it out required a huge effort of Whitehall transformation involving the removal or side-lining of numerous senior officials and the promotion of able junior civil servants who understood and implemented the programme. A similar effort seems to be needed today if the government is to succeed in launching the new reforms that must go forward. ■

Endnotes
1. These and other projections I refer to here can be found in our latest Quarterly Bulletin at https://www.patrickminford.net/QEB/QEB%202022%20July.pdf
2. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/994125/FINAL_TIGRR_REPORT__1_.pdf
3. Gai, Y, Meenagh, D, and Minford, P (2020) North and South: A Regional Model of the UK, Cardiff Economics Working Papers E2020/14, forthcoming Open Economies Review http://carbsecon.com/wp/E2020_14.pdf

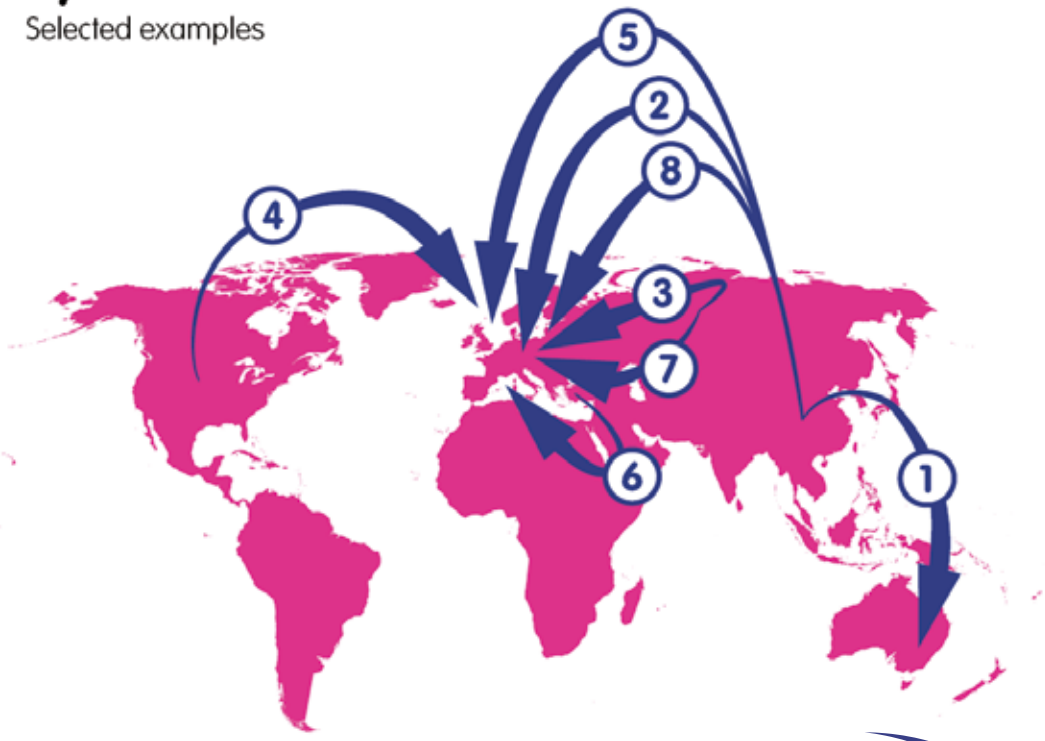
This article was finalised just after Ms Truss became Britain's new Prime Minister.

EUROPEAN COUNCIL ON FOREIGN RELATIONS ecfr.eu

The Power Atlas

The EU is increasingly threatened by economic coercion

Selected examples



1. Chinese curb on Australian exports to push back against an investigation into the origins of covid-19 (2020)
2. Chinese threat of car tariffs to pressure Germany into accepting Huawei's 5G infrastructure (2019)
3. Russian ban on Polish imports of fruit and vegetables following EU sanctions over the war in Ukraine (2014)
4. US threat of section 301 tariffs to prevent France and other European countries from levying taxes on digital services (2020)
5. Chinese 'popular boycott' of EU companies (such as Adidas and H&M) following EU sanctions on Chinese officials involved in human rights violations in Xinjiang (2021)
6. Turkish boycott of French-labelled goods following President Emmanuel Macron's announcement of policies to combat extremism (2020)
7. Russian threat to ban Czech beer imports following Czech government's declaration of links between Russian intelligence services and the 2014 Czech warehouse explosions (2021)
8. Reported Chinese suspension of rail freight to Lithuania and block on export permits for Lithuanian producers in reaction to the announcement that a Taiwanese Representative Office would open in Lithuania (2020)

Power is now defined by control over flows of people, goods, money, and data. Many states use economic tools to enhance their geopolitical power.

Check out ECFR's Power Atlas and navigate through the battlegrounds of a networked world: ecfr.eu/power-atlas

Bermuda: a fintech hotspot

Michelle Chivunga is a member of the Bermuda Fintech Advisory Board

In 2018, Bermuda created the foundation for fintech regulation with the Digital Asset Business Act (DABA), a ground-breaking set of laws and policies that provided legal clarity and transparency for businesses in the fintech industry.

Shortly thereafter, DABA was enhanced with the Digital Asset Issuance Act 2020 and the Digital Asset Issuance Rules 2020 which updated the criteria and provided clarity regarding the issuance of digital assets.

Modelled on the success of Bermuda's insurance and re-insurance industry, and leveraging the global recognition of the Island's digital leadership and unrivalled risk-management spurred by an active and inclusive regulator of financial services, the Bermuda Monetary Authority, a solid, secure regulatory environment has been paved for both global and local innovative companies.

The 3 Cs of fintech

Bermuda's collaborative approach toward building best practices exemplified in the re/insurance industry was the perfect template to establish an enviable regulatory framework, through which risks are mitigated via the three Cs of fintech: cybersecurity, custody and compliance.

- **Cybersecurity** is a significant industry issue where it is no longer a question of *"if you'll get hacked"* but *"when."* The framework has put in place clear requirements around the means to prevent cyber-attacks and to respond and mitigate them if, or more aptly when, they happen.

  Cybersecurity is one of the world's biggest areas of concern particularly as institutions are still grappling with a relatively new digital economy and new ways of doing business in a VUCA[1] and COVID-led environment.

  Bermuda is driving forward innovative approaches to providing a cyber-proof fintech ecosystem which is attracting more businesses to the Bermudian market. For digital value to be exchanged, secure and robust systems must be in place.

  Cybersecurity is centre stage for Bermuda and preventative measures are critical to mitigate against future risk. A cyber-led digital economy is necessary to boost productivity and aid economic growth.

- **Custody:** the framework is built around ensuring there are clear procedures, protections, and guidance to make sure that Bermuda companies distinguish themselves, can follow best practice, and are globally competitive. This has given them additional credibility and security.

- **Compliance:** compliance is the elephant in the room in terms of risk. Part of the reason finance has been so slow to adapt to technology is the ever-increasing list of requirements pursuant to Know Your Customer and Anti Money Laundering regulations, which can be costly and complex.

  The challenge is that many companies prioritise growth, often at the expense of proper compliance, and that introduces significant business risk. Bermuda has led the way to support businesses navigate the dynamics and complexity of compliance and places prominently within its frameworks the significance of ensuring that data is protected from misuse.

Three licenses

Bermuda's structure allows companies to progress a concept from an idea until go-to-market readiness. DABA's licensing regime provides different licenses that vary depending on the company's growth stage and readiness:

- The test license (**Class T** - test *"alpha testing environment"*) provides an environment for businesses looking to develop a business model.

  The purpose is to gain understanding of the risks of that business so that it can define for itself appropriate risk management policies and procedures. Self-risk management also enables greater accountability and responsibility by the businesses.

- The sandbox license (**Class M** - modified, *"beta testing environment"*) allows the operation of specific business activities within a defined scope and time period.

  This is designed for companies whose principals understand their business model and have scoped out the risk management policies and procedures but have not yet demonstrated the ability to implement them. The sandbox provides the environment to experiment with implementation under the supervision of a competent regulator.

- The full license (**Class F** - full, *"production environment"*) allows to fully operate a fintech business in accordance with a business plan and according to the approved classes of activities.

From alpha to beta to production, Bermuda is set to provide the necessary innovative platform and benchmark that can support the next generation of unicorn global companies. Many parts of the world are still grappling with how to regulate and manage risk with fast-transforming assets.

Indeed digital assets, although relatively new, are gaining global traction. With the Government of Bermuda's flexible and collaborative approach, the jurisdiction has led the way by lowering barriers to innovation, fostering a diverse business community, and supporting digital asset businesses to thrive.

The Currency Standard Initiative

The introduction of the Currency Standard Initiative (CSI) enables the development of standardised and harmonised rules for the private issuance and the distribution of digital value across interoperable systems.

It could boost growth not only in Bermuda but across the globe, supporting the renaissance of financial services, improving crossborder trade and opening up new market opportunities.

"Companies who are looking for a world class jurisdiction with a forward-thinking government that welcomes entrepreneurs who have an idea they are required to demonstrate on a country-wide scale can find in Bermuda the jurisdiction that can make that idea a business reality"

"CSI is an important instrument that can change the way institutions and global stakeholders interact. Imagine the removal of silos: that would significantly enable better coordination between policy makers, business leaders, regulators and innovators working together to bring not only profitable returns but sustainable and impactful value that is changing people's lives.

"At Global Policy House, we care about people and we want them to have access to this next generation of value and wealth which can complement what we have today. Mitigating risk is vital but what is unquestionable is the digital revolution bringing a new kind of value that provides opportunity to so many cut out before.

"Bermuda is leading the way by providing the way to safely build wealth that trickles down across whole communities. What could be more exciting?"

Michelle Chivunga, CEO, Global Policy House

With the current regime regulating digital assets, Bermuda is at the cutting edge of an emerging, disruptive technology. It is providing for itself the opportunity to create jobs, build an ecosystem that is best in class, generate incremental revenue, and leave for future generations a world that is innovative, customer-focused, and sustainable.

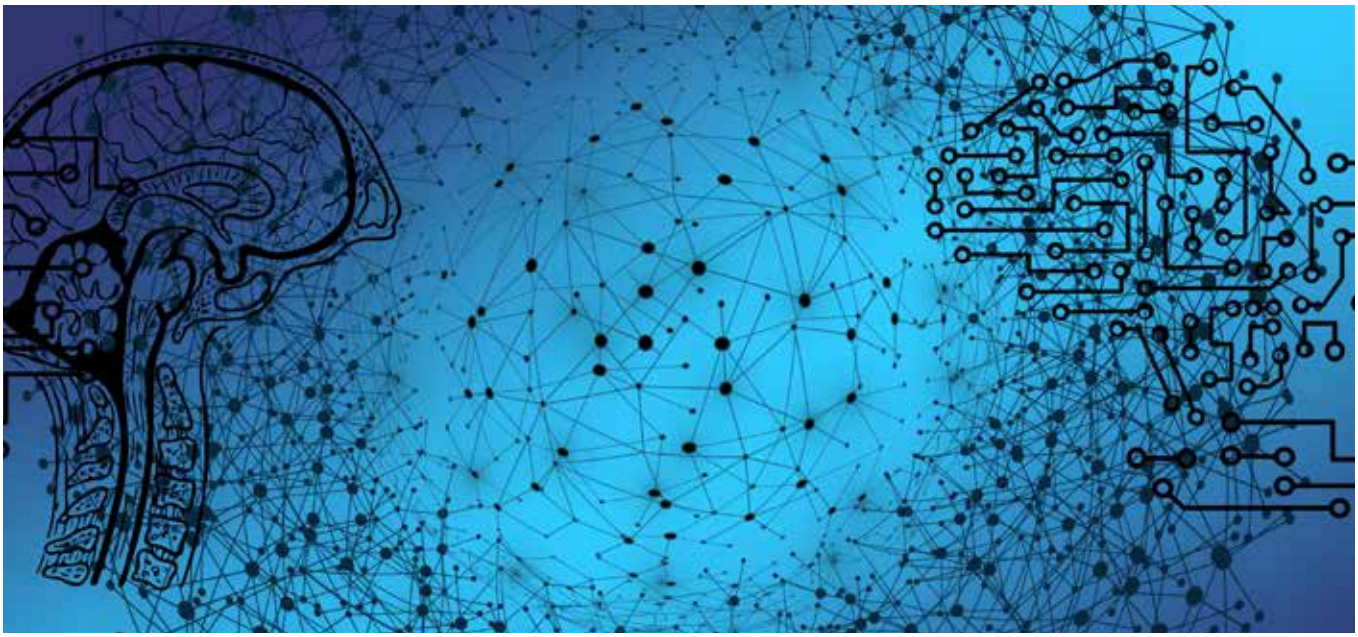
Companies who are looking for a world class jurisdiction with a forward-thinking government that welcomes entrepreneurs who have an idea they are required to demonstrate on a country-wide scale can find in Bermuda the jurisdiction that can make that idea a business reality.

One can find accelerators and incubators anywhere in the world, from London to New York to Singapore, but there's only one place where the entire place is itself is an innovation campus; and that is Bermuda. Bring your business to the Island, innovate securely and feel the magic of Bermuda. ■

Endnote
1. VUCA stands for volatility, uncertainty, complexity, and ambiguity

The impact of AI on job nature and quality

Laura Nurski is a Research Fellow and Mia Hoffmann a Research Analyst, at Bruegel



Summary

Artificial intelligence (AI), like any workplace technology, changes the division of labour in an organisation and the resulting design of jobs. When used as an automation technology, AI changes the bundle of tasks that make up an occupation. In this case, implications for job quality depend on the (re)composition of those tasks. When AI automates management tasks, known as algorithmic management, the consequences extend into workers' control over their work, with impacts on their autonomy, skill use and workload.

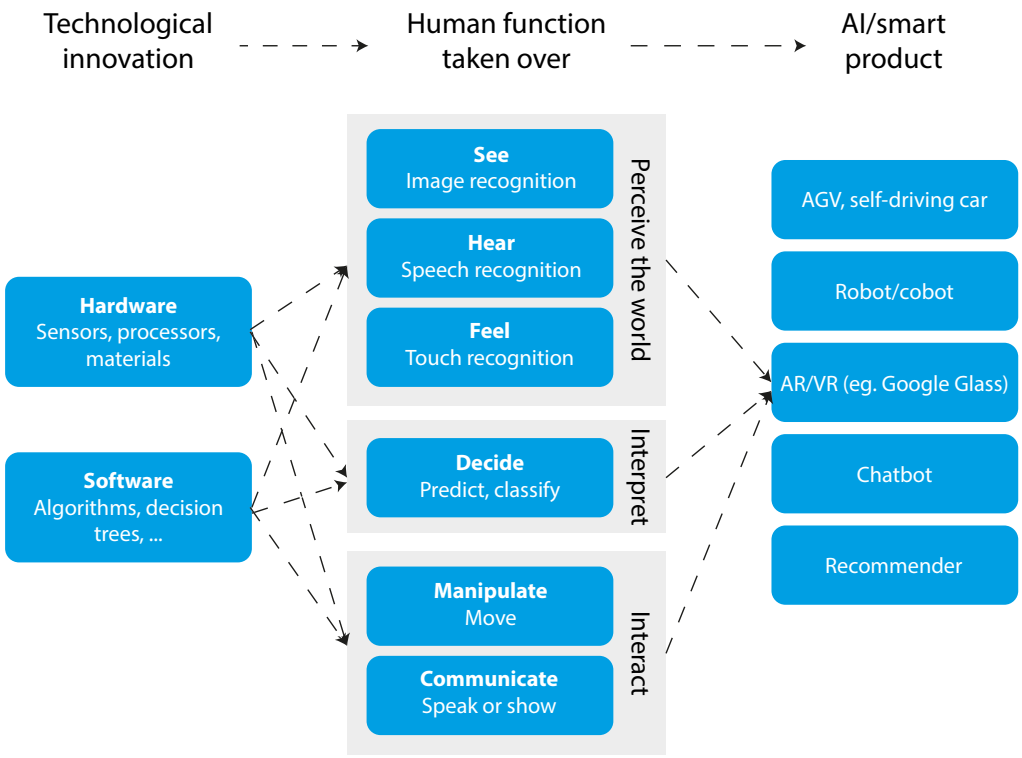
We identify four use cases of algorithmic management that impact the design and quality of jobs: algorithmic work-method instructions; algorithmic scheduling of shifts and tasks; algorithmic surveillance, evaluation and discipline; and algorithmic coordination across tasks.

Reviewing the existing empirical evidence on automation and algorithmic management shows significant impact on job quality across a wide range of jobs and employment settings. While each AI use case has its own particular effects on job demands and resources, the effects tend to be more negative for the more prescriptive (as opposed to supportive) use cases. These changes in job design demonstrably affect the social and physical environment of work and put pressure on contractual employment conditions as well.

As technology development is a product of power in organisations, it replicates existing power dynamics in society. Consequently, disadvantaged groups suffer more of the negative consequences of AI, risking further job-quality polarisation across socioeconomic groups.

Meaningful worker participation in the adoption of workplace AI is critical to mitigate the potentially negative effects of AI adoption on workers, and can help achieve fair and transparent AI systems with human oversight. Policymakers should strengthen the role of social partners in the adoption of AI technology to protect workers' bargaining power.

Figure 1. Definition of AI and smart technologies



Source: Bruegel based on AI HLEG (2019).

1 Some definitions: what is AI and what is job quality?

What is artificial intelligence?

The European Commission's High-Level Independent Expert Group on AI (AI HLEG, 2019) defined[1] artificial intelligence as *"software (and possibly also hardware) systems, designed by humans that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information derived from this data and deciding the best action(s) to take to achieve the given goal."*

The same smart product can have different effects on workers, depending on its application in the organisation. Head-worn devices, for example, can be used for different applications (giving instructions, visualising information, providing remote access or support) that affect different elements of job quality (autonomy and skill discretion, social support, task complexity, physical and cognitive workload) (Bal *et al* 2021).

The specific work setting and organisational context play key roles in determining the effects on jobs. If the head-worn technology supports the worker by providing information and supporting decentralised decision-making, it increases worker autonomy and skill discretion.

However, if the real-time connection is used to monitor the worker, prescribe work tasks and take over decision-making, then the worker loses autonomy. It is therefore necessary to further detail the specific use case or organisational application of the AI system, which we do in section 3.

First, it is helpful to understand what job quality is and how it is shaped in organisations.

What is job quality?

A good quality job (Nurski and Hoffmann 2022), is one that entails:

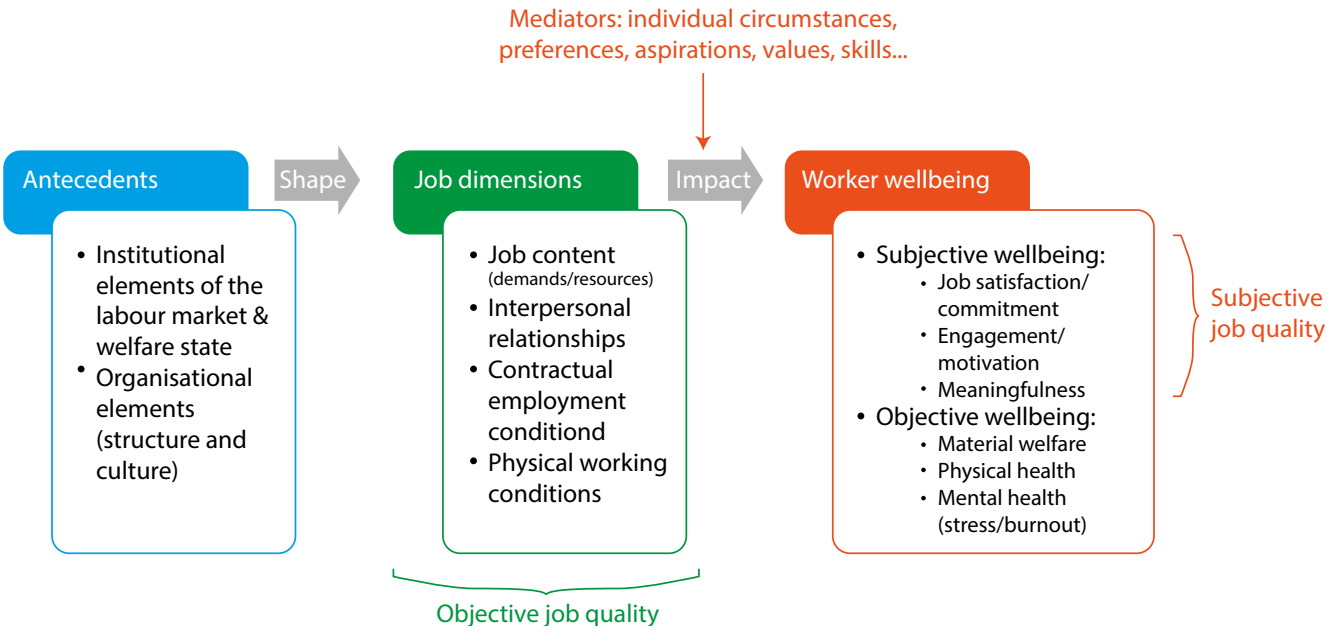
- Meeting people's material, physical, emotional and cognitive needs from work through: job content that is balanced in the demands it places on workers and the resources it offers them to cope with those demands, in its physical, emotional and cognitive aspects; supportive and constructive social relationships with managers and co-workers; fair contractual employment conditions in terms of minimum wages, working time and job security; safe and healthy physical working conditions.

- Contributing to positive worker wellbeing: subjectively, in terms of engagement, commitment and meaningfulness; and objectively, in terms of material welfare and physical and mental health.

The analysis of job quality must separate three conceptual levels: antecedents measured at a level higher than the job (ie. the firm, labour market or welfare state), job dimensions measured at the level of the job, and worker wellbeing measured at the level of the individual holding the job (see Figure 2).

Out of the four job dimensions, job content, is of particular importance as it is the main predictor of worker outcomes

Figure 2. Integrative definition of job quality



Source: Nurski and Hoffmann (2022).

in terms of behaviour, attitude and wellbeing (Humphrey *et al* 2007). Common indicators of job demands include work intensity and emotional load, while job resources include autonomy, social support and feedback.

2 Organisational antecedents to job quality

While institutional elements of the labour market (including working time regulation and minimum wages) can put boundaries on some dimensions of job quality, most of its elements are shaped inside the organisation.

Job content originates from the division of labour in the organisation

The set of tasks and decisions that make up the content of a job is the result of a division of labour within an organisation. Organisations consist of both production and governance activities (Williamson, 1981).

Production activities contribute directly to transforming an input to an output, while governance includes preparation, coordination and support activities (Delarue 2009). The division of labour across these production and governance activities results in an organisational structure made up of a horizontal production structure and a vertical governance structure (de Sitter 1998).

The amount of horizontal specialisation in production activities determines the 'breadth' of a job: if a worker only executes one highly specialised task repeatedly, she has a narrow job, while if she executes a variety of production tasks, she has a wide job.

The 'depth' of a job, on the other hand, is determined by the amount of vertical specialisation in terms of the control over the work. If a worker controls aspects of her work such as quality control, planning, maintenance or method specification, then she has a deep job, while if she only executes her tasks without having any control over the how, when and why, then she has a shallow job (Mintzberg, 1979, chapter 4).

The link between job depth and breadth on the one hand and job quality on the other is established in the job demands-control model (Karasek 1979), extended in the job demands-resources model (Demerouti *et al* 2001), detailed in Ramioul and Van Hootegem (2015).

Too-narrow job design (ie. too much horizontal fragmentation) might increase job demands through highly repetitive, short-cyclical labour. Too-broad job design and too much task variation on the other hand might cause overload, conflicting demands and role ambiguity.

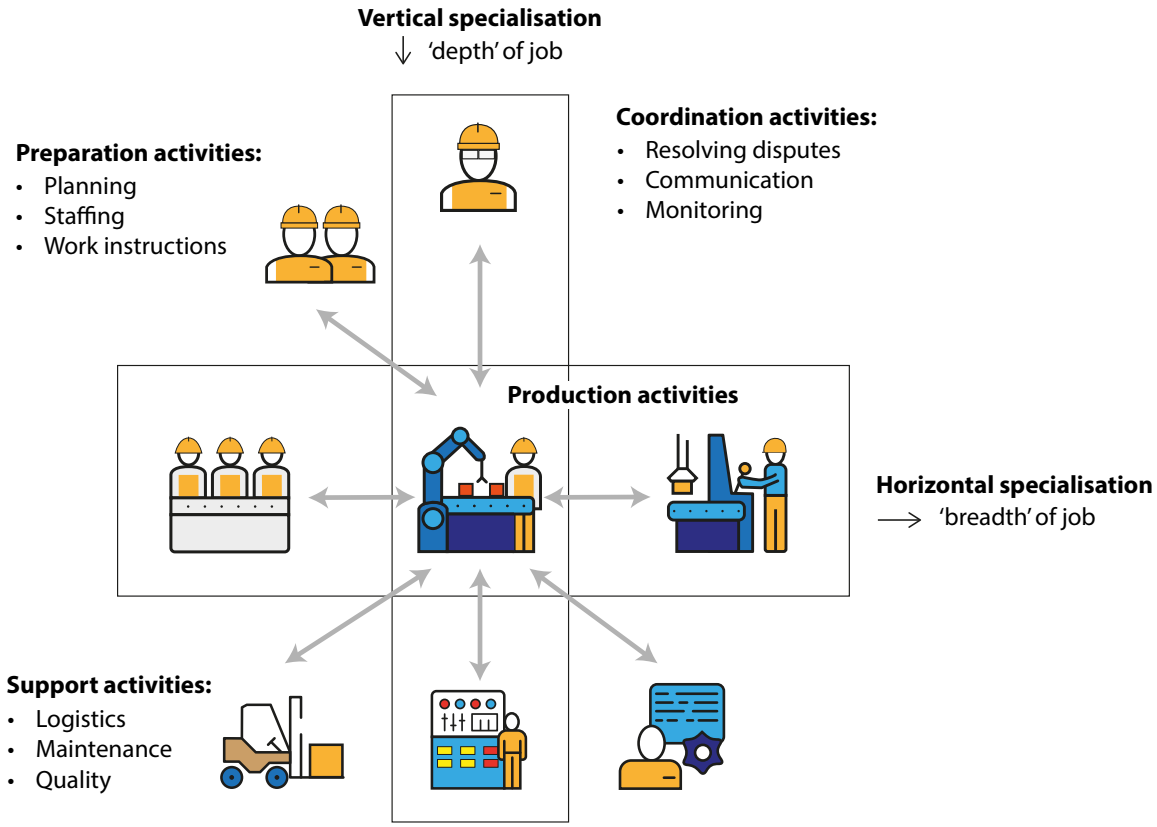
Similarly, too-shallow job design (ie. too much vertical fragmentation) means that workers lack the decision latitude to resolve issues and disruptions. Too-deep job design however might put an undue burden of excessive decision-making on workers (Kubicek *et al* 2017).

Good quality job design thus provides a manageable balance between job demands on workers and the job resources provided. While too-wide or deep job design might cause stress and overload for the worker (especially when she has more demands than resources), too-narrow or shallow job design is likely to lead to underutilisation and low meaningfulness of work.

Job content determines the other dimensions of job quality

Once job content is designed through vertical and horizontal specialisation, it further determines each of the other job

Figure 3. Job content originates from the division of labour in the organisation



Source: Bruegel based on Mintzberg (1979) and Delarue (2009).

dimensions. Indeed, while the four job quality dimensions listed in Figure 2 are conceptually different and independent of each other, empirically they tend to move together.

Latent class analysis on a survey of 26,000 European workers shows that clusters of jobs can be found that have similar characteristics along these dimensions (Eurofound 2017). Not unsurprisingly, these clusters can be identified along the lines of occupations and sectors and therefore job quality differences can mostly be explained by occupation and sector (Eurofound 2021).

The link between job content and contractual conditions is straightforward and often formalised by linking job titles and job descriptions with salary structures and pay grades. In the economic literature, it is also generally accepted that the nature of tasks within a job directly determine how much a job will be rewarded.

More complex tasks that require more advanced or a greater variety of skills receive higher wages (Autor and Handel 2013). There is also a direct link to working-time quality, as tasks in a continuous process (either production or services) will require at least some people to work in shifts or weekends.

Similarly, job content determines directly the physical environment of a worker and any exposure to hazardous ambient conditions or safety risks. When a worker performs cognitive tasks, her physical environment is likely an office with a desk and a computer and health risks are mostly ergonomic.

When a worker performs manual production tasks, her environment is likely a factory or resource extraction facility, and physical health and safety risks are most prominent. When a worker does in-person care or service work, her environment likely consist of a school, shop or care institution, and health and safety risks mostly stem from interpersonal interactions such as workplace violence.

Finally, perhaps less obvious at first sight, job design determines the social environment of the workplace. By allocating tasks and decisions to specific jobs, interdependencies between tasks held by different people require coordination between those people.

When this coordination is handled badly, misunderstanding and frustration is created between people, both horizontally (between colleagues) and vertically (between management and workers), potentially undermining constructive professional relationships and emotional support.

On the other hand, well-managed interdependencies between colleagues and optimally designed teams offer the opportunity for the development of a positive social environment.

"Policymakers and employers need to look beyond working conditions into job design (job demands and resources) to understand the full impact of AI on job quality"

3 Typology of AI use cases in the functions of the organisation

Adoption of AI in the workplace changes the above-mentioned division of labour in the production and governance process – and therefore the resulting job design.

Applying AI in the production process is called 'automation' and is defined as *"the development and adoption of new technologies that enable capital to be substituted for labor in a range of tasks"* (Acemoğlu and Restrepo 2019, p.3).

The application of AI in the governance process is known as 'algorithmic management'(AM) and is defined as *"software algorithms that assume managerial functions"* (Lee *et al* 2015, p.1603). To narrow down the different functions within AM, we refer to the management literature to retrieve generally accepted 'functions of management'[2].

We integrate the definitions of Cole and Kelly (2011)[3] and Martela (2019)[4] by defining the functions of management as:

(1) Goal specification: specifying the vision or objectives of the organisation;

(2) Task specification: specifying the organisation of work necessary to achieve the objectives, including
a. task division: how the whole process is divided into individual tasks;
b. task allocation: how individual tasks are combined and allocated to roles;
c. task coordination: how tasks are coordinated across roles;

(3) Planning specification: specifying the order and timings of tasks, ensuring all the material and human resources are available in the right time and place;

(4) Incentivising behaviour: ensuring that everyone behaves in a way that adheres to the specifications above (in both a controlling and a motivating sense);

(5) Staffing: filling all the roles with people and ensuring that people have the right skills for these roles.

In theory, AI could be used for each of these five management functions. While we didn't come across any applications specifying the goals or vision of the organisation, we did find many applications in the remaining four management functions, as well as in task execution.

Focussing on the organisational function of AI and not on the specific technological product (like a head-worn device) or a specific employment setting (like platform work), brings two benefits.

Table 1. Functions of management and AI use cases

Functions of the organisation		**All use cases**
Governance/ management	Goal specification (vision)	-
	Task specification	Algorithmic work method instructions
		Algorithmic task coordination
	Planning	Algorithmic scheduling of tasks and shifts
	Incentivising behaviour	Algorithmic surveillance, evaluation and discipline
	Staffing	Algorithmic recruiting and selection, learning and development, promotion and termination
Production	Task execution	Automation

Source: Bruegel based on Cole and Kelly (2011), Martela (2019) and Puranam (2018).

First, as Bal *et al* (2021) showed in their review of head-worn devices, the impact of technology varies with its specific application. By skipping the product level, we immediately investigate the level of the organisational function which directly influences job design.

Second, by rising above the specific employment setting, we can say something general about AM both in traditional jobs and in new employment settings. Comparing our typology of AM to others in the literature, we especially want to highlight two:

- Wood (2021) used the classification of Kellogg *et al* (2020), based on Edwards' (1979) foundational typology of control mechanisms in organisations: (1) algorithmic direction (what needs to be done, in what order and time period, and with different degrees of accuracy); (2) algorithmic evaluation (the review of workers' activities to correct mistakes, assess performance, and identify those who are not performing adequately); and (3) algorithmic discipline (the punishment and reward of workers in order to elicit cooperation and enforce compliance).

  Our approach – from a job-design perspective – separates directions in work method from directions in the timing of work, since method autonomy and scheduling autonomy have different effects on workers' wellbeing, motivation and stress levels (Breaugh, 1985; De Spiegelaere *et al* 2016).

  On the other hand, we combine evaluation and discipline in one category as they are both meant to incentivise behaviour and ensure adherence to the task and planning specification. We therefore consider them the same concept on a scale from soft incentive to hard discipline.

- Parent-Rocheleau and Parker (2021) also developed an AM typology from a job-design perspective, which includes: monitoring, goal setting, performance management, scheduling, compensation and job termination.

  However, their six defined functions have several overlaps. For example, their definition of monitoring refers to *"collecting, storing, or analysing and reporting the actions or performance of individuals or groups"*, but they further explain that this data can be used to set goals, assign tasks, set performance targets and evaluate them.

  We therefore do not include monitoring as a separate function but include it in surveillance of effort and evaluation of performance.

  Moreover, their definition of management functions is based on current technical capabilities of algorithms, which is likely to be quickly outdated at the current pace of innovation. In contrast, long-standing theories on the functions of management still apply today, despite considerable changes over time in the nature of work.

In our typology, the first three management functions in Table 1 (goal, task and planning specification) can be thought of as only impacting the design of the job, without considering the selection of the person in the job.

They determine directly the amount of job demands and resources or control people have over their job, especially control over the work methods, work schedules and work objectives.

Breaugh (1985) identified exactly these three facets of autonomy as distinct concepts[5] and they can also be recognised in the European Working Conditions Survey questions[6]. Finally, empirical research confirms that these different facets of autonomy have different effects on workers (De Spiegelaere *et al* 2016).

The final two management functions in Table 1 consider the alignment of a person with the job. The fourth (incentivising behaviour) can amplify the effects of the first three by squeezing out any room for manoeuvre that might have been left in the original job design.

The fifth (staffing) matters from an inclusion perspective as it determines who gets put in which job. Given that discrimination in staffing functions (recruitment and selection, learning and development, promotion and termination) has been extensively documented elsewhere[7], we do not include this use case in our review.

In practice, algorithmic management algorithms often serve several of these managerial functions at once. The most obvious example is that all management algorithms also automate away tasks of human managers, such as scheduling or supervision.

But more nuanced overlaps exist as well, such as task assignment-algorithms that simultaneously keep track of the speed of execution in order to allocate the following task in a timely matter (Reyes 2018).

4 Five AI use cases in automation and algorithmic management

For each of the AI use cases, we gathered current scientific evidence on mechanisms of impact on various aspects of job content and the implications for social, physical and contractual working conditions.

We used the job demands-resources model (Demerouti *et al* 2001) to assess how AI impacts job content, including work intensity (workload, pace, interdependence), emotional demands, autonomy, skills use, task variety, identity and significance.

Papers in the review are placed at the intersection of computer science and psychology, sociology and management science. They include summary papers and reports, scientific literature reviews, micro-level empirical research using panel data, qualitative case studies of organisations or workers exposed to automation or governance AI, and books and news articles.

We identified the specific organisational function of the algorithmic system in each research setting. Most case

studies investigate entire algorithmic systems that often exhibit multiple features belonging to different managerial functions, which we separated and analysed individually.

Automation

Automation has been the primary purpose of technology adoption in the past. Today, AI and other smart technologies can perform a wider range of tasks than previous automation technology, including routine and repetitive tasks, and also non-routine cognitive and analytical tasks.

AI increasingly enables workers and robots to collaborate at closer physical proximity by reducing safety risks associated with close human-machine interaction (Gualtieri *et al* 2021; Cohen *et al* 2022).

Since currently hardly any jobs can be fully automated, most workers will experience a reallocation and rebundling of the tasks that together form their occupations. Implications for job quality depend on the (re)composition of those tasks.

If technology takes over simple, tedious or repetitive tasks, workers can spend more time on complex assignments that require human-specific knowledge, including judgment, creativity and interpersonal skills.

Complex and challenging work implies a better use of skills and is associated with higher job satisfaction. Yet, permanently high cognitive demands raise work-related stress, since mental relief from handling 'simple' tasks disappears (Yamamoto 2019).

The automation of analytical or operational tasks may induce a shift from active work to passive monitoring jobs which are associated with mental exhaustion (Parker and Grote 2020). This exhaustion results from the need to pay close attention to processes requiring little to no intervention, while engaging tasks have been taken away.

Negative consequences for operational skills and work performance are well-documented, for example among aircraft pilots and in relation to autonomous vehicles (Haslbeck and Hoermann 2016; Stanton 2019).

Former operators who become supervisors of machines or algorithms gradually lose their skills and operational understanding. As a result, their ability to detect errors or perform tasks in case of system failures degrades, undermining their task control abilities and cultivating technological dependence (Parker and Grote 2020).

Collaborating with automation technology, as opposed to supervising it, has different implications for job quality. Robotisation in general is associated with work intensification as workers adapt to the machines' work pace and volume, and tasks become more interdependent (Antón Pérez *et al* 2021). Work may become more repetitive and narrower in scope, reducing task discretion and autonomy (Findlay *et al* 2017).

Moreover, the integration of automation technology in workflows promotes task fragmentation, which reduces task significance by separating workers' tasks from larger organisational outcomes and goals (Evans and Kitchin 2018).

At the same time the effects of human-robot collaboration on mental stress are not straightforward: some studies find that collaborating with robots is stressful for workers (Arai *et al* 2010), while others find no such effect (Berx *et al* 2021).

Automation-induced changes in job content often imply changes in the physical working environment. When technology is used to automate dirty, dangerous and strenuous tasks it may alleviate occupational health and safety risks (physical strain, musculoskeletal disorders, accidents) (Gutelius and Theodore 2019).

Meanwhile, if AI integration leads to more desk and computer work it may also exacerbate health risks associated with sedentary behaviour (Parker and Grote 2020; PAI 2020)[8].

Then, the addition of autonomous machines to workplaces may pose new dangers to worker safety, from collision risks to malfunctions due to sensor degradation or data input problems (Moore, 2019).

The effects of task reallocations can also spill over to the social work environment. Automation of some tasks may allow more collaboration with colleagues or closer interactions with supervisors, or workers may spend more time on client-facing activities (Grennan and Michaely 2020).

At the same time, working in a highly automated environment as opposed to working with humans can lead to greater workplace isolation (Findlay *et al* 2017).

On contractual implications, the continued automatability of tasks increasingly enables firms to replace (expensive) labour with (cheaper) capital inputs. In the short term, AI-powered automation likely reduces labour demand for certain tasks and thereby occupations, driving down wages (Acemoglu and Restrepo 2020).

This effect is more pronounced in low-skill jobs, characterised by repetitive tasks, or where skill content declines due to automation, as labour input becomes more replaceable (Graetz and Michaels 2018).

For workers exposed to automation, this implies lower job security and deteriorating career prospects, adversely affecting mental health (Patel *et al* 2018; Abeliansky and Beulman 2021; Schwabe and Castellacci 2020).

At the same time, automation may stimulate labour productivity growth and raise real wages through lower output prices (Graetz and Michaels 2018).

Grennan and Michaely (2020) showed that similar patterns also apply to automation of knowledge work among financial analysts. Increased exposure to automation from AI-powered prediction analytics leads to worker displacement, task reallocation towards more creative and social tasks, and improved quality of work (lower bias), but lower remuneration.

Algorithmic scheduling of shifts and tasks

Algorithmic planning automates the process of structuring work through time. Two forms of technology-enabled planning can be distinguished:

> (1) algorithmic shift scheduling, meaning the assignment of work shifts based on legal boundaries, staff availability and predicted labour demand;
>
> and (2) algorithmic task scheduling, meaning setting the order of tasks, the pace of execution and updating sequences in response to changing conditions.

Algorithmic support is useful in complex and heavily regulated scheduling environments such as healthcare (Uhde *et al* 2020). Elsewhere, algorithmic scheduling is growing increasingly popular for its cost-saving properties (Mateescu and Nguyen 2019b), especially in hospitality and retail (Williams *et al* 2018).

Using historical data on weather, foot traffic or promotions, AI systems can forecast labour needs with growing accuracy to prevent overstaffing during periods of low demand. This implies that there are just enough staff present to get the work done at any given time. As a result, work intensity during shifts rises, since they do not include periods of low activity (Guendelsberger 2019).

The fact that prediction accuracy increases closer to the date in question incentivises short-notice schedules. In one case study of a food distribution centre, workers received a text message in the morning that either confirmed or cancelled their shift for the same day, based on their previous shift's performance[9] (Gent, 2018).

Furthermore, real-time monitoring of conditions allows incremental scheduling adjustments in response to sudden changes, relying on workers on on-call shifts.

Consequently, algorithmically generated schedules tend to be unpredictable, often published only few days in advance; inconsistent, varying considerable from week to week; and inadequate, assigning fewer hours than preferred, leading to high rates of underemployment (Williams *et al* 2018).

This leaves workers with considerable working time and income insecurity. It also places a lot of strain on the organisation of non-work life, particularly for people with caregiving responsibilities (Golden 2015).

The consequences for non-work life are far-reaching: Harknett *et al* (2019) detailed the adverse health effects of unpredictable schedules, including sleep deprivation and psychological distress, and how exposure to unstable schedules affects workers' young children who suffer from heightened anxiety and behavioural problems.

These effects are often aggravated by poor system design choices, such as not allowing for autonomous revisions or shift switching among colleagues, reducing worker control (Parent-Rocheleau and Parker 2021) and harming team morale (Uhde *et al* 2020).

Crucially, in retail stores, stable schedules have been shown to ultimately benefit productivity and sales by raising staff retention rates (Williams *et al* 2018).

Algorithmic scheduling is not limited to offline work. On food delivery platforms such as Deliveroo and Foodora, the number of shifts is algorithmically determined one week in advance, based on forecast demand for various geographic zones and timeslots (Ivanova *et al* 2018).

Rider's access to these shifts however depends on performance-based categorisation[10]: the top third of workers get to choose first, while the bottom third must take the remaining shifts. This significantly reduces workers' working time flexibility typically associated with, and heavily advertised, in platform work.

It also causes underemployment and income insecurity, as some workers are unable to pick up as many shifts as they want. Since schedules are based on expected demand, fluctuations can lead to acute workload pressure and create safety risks if workers are nudged to come online in particularly adverse conditions (Gregory 2021; Parent-Rocheleau and Parker 2021).

Even ride-hailing platforms which don't operate under a formal scheduling system feature soft controls aimed at influencing drivers' working time and thus undermining their autonomy (Lee *et al* 2015).

Uber drivers, for example, receive messages that nudge them to log on, or stay logged on, at times when the algorithm predicts high demand, which leads workers to be on-call without any guarantees they will receive ride requests (Rosenblat and Stark 2016).

Beyond shift planning, algorithmic scheduling of tasks within shifts aims to optimise workflows, reduce disruption and increase efficiency. In manufacturing or logistics, for example, optimised timing of order releases or sequencing of production orders can alleviate pressure in high-intensity work environments (Briône 2017; Gutelius and Theodore 2019).

However, ordering tasks algorithmically also reduces workers' autonomy to organise their work in a way they see fit (Briône 2017), and instantaneous task assignments may accelerate the pace of work (Gutelius and Theodore 2019).

Reyes (2018) described the implications of a room-assignment algorithm for housekeepers in a large hotel. The system prioritised room turnover and assigned rooms to housekeepers in real-time once guests checked out.

For housekeepers, who previously were assigned individual floors to clean during the day, the inability to self-determine the sequence of rooms led to an increase in workload and time pressure, as the algorithm sent them across different floors and sections of the hotel, not accounting for their heavy equipment.

Algorithmic work method instructions

Work method instructions refer to the algorithmic provision

of information to workers on how to execute their work, often in real-time and personalised to the workers' current activity. The purpose is typically to raise the quality of output, by reducing the probability of human error or by lowering the skills required to perform a certain task.

The practice ranges from enabling access to contextually relevant information to giving instant feedback to delivering live instructions about methods.

Enabling access to relevant information increases autonomy, as it builds capacity for decentralised decision-making at a local level. In contrast to communication technology, which tends to promote reliance on others for decisions, information technology empowers agents to handle tasks more autonomously (Bloom *et al* 2014).

Case studies support this finding, provided that the information is relevant, and workers can decide freely whether or not to use it (Bal *et al* 2021). A study on patient monitoring among anaesthetists found that providing doctors with smart glasses that superimpose patients' vital signs onto their field of vision reduced the need to multitask (monitoring multiple sources of information), reducing mental strain (Drake-Brockman *et al* 2016).

In fact, participants found the device so useful that when asked how to improve it, the most frequent answer was for more information to be displayed.

Access to contextual information can also improve workers' safety: AI-enhanced personal protective equipment can monitor and evaluate environmental conditions including temperature, oxygen levels or toxic fumes, thus helping workers, like firefighters, navigate high-risk work environments (Thierbach 2020).

Conversely, the absence of information can reduce worker control. Ride-hailing apps, for example, alert drivers to areas with higher prices in order to encourage them to move to those areas and satisfy excess demand.

Drivers are free to choose to follow or ignore this information, giving them autonomy over whether or not to exploit fare-price variations (Lee *et al* 2015). At the same time, when offered a ride request, drivers do not receive crucial information about the destination or the fare before having to decide (15 seconds) (Lee *et al* 2015; Rosenblat and Stark 2016).

The same holds for food-delivery workers at Deliveroo and Foodora, who do not know the address of the customer when they accept restaurant pick-ups (Ivanova *et al* 2018). Workers' capacity to determine which rides are worthwhile is limited by this design choice.

AI-supported personalised, real-time feedback can support on-the-job learning (Parker and Grote 2020) and clarify role expectations (Parent-Rocheleau and Parker 2021). The installation of an intelligent transportation system in London buses gave drivers real-time feedback on their driving behaviour (speed, braking, etc.).

While this algorithmic monitoring and evaluation did reduce their work method discretion, workers also described the feedback as helpful to inform better driving practices in adverse conditions, and used the information to learn and improve safe driving behaviour (Pritchard *et al* 2015).

Real-time, personalized feedback can also benefit workers' health. Wearables equipped with smart sensors can monitor body movements like twisting or bending, identify unsafe movements and detect hazardous kinetic patterns (Nath *et al* 2017; Valero *et al* 2016).

Workers are notified about the occurrence of dangerous movements either via instant alerts, such as vibrations or beeping, or through summary statistics at the end of the workday, which can help to identify and prevent potentially risky habits (Valero *et al* 2016)[11].

Experts warn, however, that the permanent monitoring of movement could also be used to track work efforts and breaks, contributing to a permanent state of surveillance that undermines workers' autonomy and raises stress levels (Gutelius and Theodore 2019).

Crucially, the distinction between learning-supportive algorithmic feedback provision, and prescriptive automated work instructions can be fuzzy. Voice recognition systems at call centres monitor customers' and agents' conversations for emotional cues and provide feedback on the appropriateness of operators' responses (see eg. Hernandez and Strong, 2018; De la Garza 2019).

Feedback comes in the shape of instructions: to talk more slowly, display higher alertness or say something empathetic, to improve the customer's experience. This not only reduces worker discretion over how to respond to customers, it also removes the need for emotional and interpersonal skills to judge a customer's mood and choose how to react to it (Parent-Rocheleau and Parker 2021).

Work-method instructions also come in more explicit and prescriptive forms, typically transmitted through wearable or handheld devices. In order-picking, voice- or vision-directed applications provide step-by-step instructions to workers, navigating them through the warehouse with the goal of increasing efficiency by reducing the time spent on low-value activities like walking (Gutelius and Theodore 2019).

The practice of 'chaotic storage', meaning the storage of inventory without an apparent system enabled by the digital recording of items' location, raises worker dependency on the devices' instructions to find and collect items, and prevents the acquisition of organisational knowledge (Delfanti 2021).

The main consequence is work intensification, as continuous instructions and instant initiation of the next task accelerates the work speed and ensures workers' attention is permanently focused on the task at hand (Gutelius and Theodore 2019).

Integrating AI-driven instructions into manufacturing workflows induces task standardisation and accommodates

lot-size manufacturing (Moore, 2019; Parker and Grote 2020). Smart glasses or other devices are used to carry out on-the-spot production tasks, especially in the case of smaller orders of customised products. The glasses provide on-the-spot instructions, guiding the user in executing a task that is only done once to produce a specific order.

While this shortens learning curves and improves learnability in complex work environments, it can also lead to skill devaluation and obsolescence (Bal *et al* 2021).

Workers need fewer pre-existing skills to perform the job and do not acquire new, long-term skills on the job, as they are always told exactly what to do and when to do it without necessarily knowing why.

The social and contractual implications are similar across all types of work-method direction. First, they reduce social interactions at work (Gutelius and Theodore 2019; Bal *et al* 2021). As each and every step needed to perform a task is readily displayed, the need to collaborate to solve problems disappears.

And since workers' attention is fixed on the virtual device, other communication between colleagues decreases, too (Moore 2019). Second, lower job complexity alleviates entry barriers for less-skilled workers, but increases worker replaceability.

This enables growing reliance on labour brokers and temp workers, thereby harming job security and career prospects, and placing downward pressure on wages. (Gutelius and Theodore 2019).

It is therefore critical to distinguish between technologies that augment workers' decision-making capacity and support learning, and those that replace human decision-making at work.

Algorithmic surveillance, evaluation and discipline

Surveillance has always been an important means of control in the workplace. Digital technologies including CCTV and e-mail have made surveillance of the workspace more ubiquitous, but have still confined it to surveillance-by-observation (Edwards *et al* 2018).

Cheap monitoring tools combined with data availability and computing power have given rise to surveillance-by-data collection (Mateescu and Nguyen 2019a). Sensors, GPS beacons and other smart devices can continuously extract granular, previously unmeasurable, information about workers, and feed into algorithmic or human workforce management decision (Edwards *et al* 2018; Mateescu and Nguyen 2019a).

The motivations of organisations in adopting these types of monitoring practices are multifaceted and range from *"protecting assets and trade secrets, managing risk, controlling costs, enforcing protocols, increasing worker efficiency, or guarding against legal liability"* (Mateescu and Nguyen 2019a, p.4).

In itself, ubiquitous monitoring lowers job quality, as feelings of constant surveillance can cause stress, raise questions of data privacy, undermine workers' trust in the organisation (Moore and Akhtar 2016) and make them feel powerless and disconnected (Parker and Grote 2020).

Continuous monitoring places excessive pressure on workers to follow protocols exactly, curbing work-method discretion. UPS drivers reported how delivery vehicles equipped with a myriad of sensors now track every second of their day, including when they turn the key in the ignition, fasten their seatbelt or open the door.

As a result, workers are held accountable for minor deviations from a protocol designed to optimise efficiency and safety, such as turning on the car before fastening the seatbelt (which is considered a waste of fuel) (Bruder 2015).

Minute-by-minute records of work activities can also be used to redefine paid worktime by enabling employers to exclude time in which workers don't actively engage in (measurable) task execution (Mateescu and Nguyen, 2019a). This has consequences for workers' income security and incentivises overwork.

In the UK home-care sector, Moore and Hayes (2018) found that the use of a time-tracking system, which defined work hours only as contact time, led to a decrease of paid worktime, an increase in hours worked and less autonomy for care workers, as time restrictions prevented independent judgement over how much care a patient needed.

This practice is also well-documented in the warehousing industry, where handheld devices meant for scanning products and workstations (so-called 'guns') are used to keep track of work productivity and *"time off task"* (TOT) (Gurley 2022).

Workers' TOT begins as soon as the last item is scanned and ends only once the next item is registered. Since even small increments of 'idle' time must be justified, workers feel unable to take full breaks because walking out of the vast warehouse takes too much TOT (Burin 2019).

The effects of monitoring are aggravated once collected data serves as an input to algorithmic performance evaluations and discipline. Data-based, 'objective' performance evaluations promise to mitigate human bias and promote equity and fairness at work, but the objectivity and fairness of algorithmic decision-making is contested (Briône 2020; Parker and Grote 2020; PAI 2020).

Performance scores are typically based on collections of granular metrics reflecting work volume, quality and in some cases customer ratings, evaluated against some benchmark or target (Wood 2021). Algorithmic discipline refers to the automatic punishment or reward based on worker's recorded performances.

In practice, there are varying degrees of automating worker evaluation and discipline, ranging from algorithmic scores

contributing to managers' overall assessments, to the fully automated execution of disciplinary and reward measures.

In combination, algorithmic evaluation and discipline are often used to erect an incentive architecture that elicits worker behaviour that aligns with an organisation's interest.

In platform work particularly, a near-fully automated system of evaluation and discipline severely undermines workers' decision latitude.

Drivers' performance scores at ride-hailing apps Uber and Lyft are based on metrics including their ride-acceptance rate (above 80 percent), cancellation rate (below 5 percent), customer ratings (above 4.6) (Rosenblat and Stark 2016; Lee *et al* 2015) and driving behaviour (acceleration, speed and braking) (Kellogg *et al* 2020).

If they fail to achieve benchmarks, they risk automatic, temporary suspension or permanent deactivation from the platform (Lee *et al* 2015). At the same time, Uber offers occasional promotions, such as guaranteed hourly pay, for high- performing drivers (although the exact conditions for receiving the promotion are opaque) (Lee *et al* 2015; Rosenblat and Stark 2016).

Thus, workers face dual-control mechanisms – job insecurity on the one hand and better earnings on the other – that limit their discretion over which rides to accept or whether to cancel unprofitable ones.

Customer ratings increasingly feed into workers' algorithmic performance evaluations, even in traditional, service occupations such as food services, hospitality or retail (Orlikowski and Scott 2014; O'Donovan, 2018; Levy and Barocas 2018; Evans and Kitchin 2018).

Workers may feel like they are under constant surveillance by customers and must present a friendly demeanour at all times, adding to the existing emotional demands of service occupations. Workers may also feel the need to comply with clients' demands at the expense of safety for fear of receiving a poor rating (Mateescu and Nguyen 2019b).

Workers may engage in significant preparatory and emotional labour to make customers happy: ride-hail drivers supply bottled water or phone chargers, and observe and judge passengers' moods to decide if they should make conversation or not (Rosenblat and Stark 2016).

Nonetheless, customer ratings are often perceived as idiosyncratic, reflecting not only the quality of the ride but also circumstances beyond drivers' control, such as high prices, traffic, the mental state of the customer (Lee *et al* 2015) or customers' biases (Rosenblat *et al* 2017).

While platform work is the most prominent example for the use of algorithmic evaluation and discipline, the practice is also gaining ground in traditional employment, including retail (Evans and Kitchin, 2018), call centres (Hernandez and Strong 2018), public transport (Pritchard *et al* 2015), parcel delivery (Bruder 2015), trucking (Levy 2015) and most importantly, warehousing (see eg. Mac 2012; Liao 2018; Gent 2018; Bloodworth 2019; Burin 2019; Guendelsberger 2019; Delfanti 2021; Gurley 2022).

While fully automated disciplinary actions are less common in these settings (Amazon's automated firing algorithm made headlines in 2019 (Lecher 2019)), algorithmic performance analytics often play a critical role in supervisors' decisions (Wood 2021), or subpar performance is flagged to a supervisor instantaneously (Burin 2019; Gurley 2022; Hernandez and Strong 2018).

Moreover, performance metrics are used in other ways to incentivise work effort and raise productivity. Increasingly, organisations are introducing game-like elements to performance tracking, creating high-pressure work environments. Workers may be shown a countdown that tracks how many seconds they have left to finish their task (Guendelsberger 2019; Bruder 2015; Gent 2018).

Visual, haptic or sound alerts that signal missed targets or low performance make workers aware they are being evaluated (Pritchard *et al* 2015; Guendelsberger 2019; Gabriele 2018).

Dashboards that track workers' progress and rank co-workers against each other introduce competitive dynamics in an attempt to stimulate effort, but undermine social support among colleagues (Pritchard *et al* 2015; Leclerq-Vandelanoitte 2017; Gutelius and Theodore 2019).

Similarly, the use of top-performers' scores as productivity targets for their co-workers causes further work intensification (Burin 2019; Guendelsberger 2019). These high-pressure work environments and constant reminders of surveillance create fears of repercussions and incentivise workers to *"beat the system"* (Ajunwa *et al* 2017).

In order to achieve their SPORH targets (stops per on-road hour), UPS drivers circumvent safety protocols, putting themselves and others in danger (Bruder 2015). Levy (2015) found that truck drivers felt so pressured by a performance-monitoring system, they skipped breaks, safety checks and sleep in order to make up lost time in traffic or during loading and unloading.

Skipping safety measures is an unintentional result of surveillance being always incomplete, which is one of the biggest shortcomings of datafied performance assessments. The practice automatically gives more importance to quantified aspects of a job over more difficult-to-capture parts of work (Mateescu and Nguyen 2019a).

In order to meet performance targets, workers shift their efforts towards these quantifiable activities at the expense of others, reducing not only their task variety but also their autonomy to organise and prioritise.

In Evans and Kitchin's study (2018) of a large Irish retailer, interactive emotional work was not captured by the big data infrastructure. Time spent on customer service does not just

go unrecognised by the system, it also impacts negatively other performance metrics.

As a result, workers reorient their efforts to become 'data-satisfying' rather than customer-centric, and describe customer service as a 'thankless task' (p.8). In certain settings, such as care work, such an incomprehensive definition of performance diminishes task identity and meaningfulness by devaluing the relational aspects of care, like companionship (Moore and Hayes 2018).

Defining a job in terms of excessively abstract data on fragmented, quantified output impedes a shared understanding of the work environment, with consequences for worker engagement and the relationship to supervisors and the organisation (Evans and Kitchin 2018).

Algorithmic coordination across tasks

The coordination of interdependent tasks, the collective or consecutive execution of which leads to the completion of a certain product or workflow, is a key function of organisations. Coordination of tasks might be needed across time – when one task needs to follow another – or across methods – when the execution of one task depends on how another was executed.

AI is used both to support coordination still done by humans and to automate it altogether, no longer needing a human in the loop.

Algorithmic support for task coordination is taking shape in the augmentation of communication technology (CT) at work, which is widely believed to have had ambiguous effects on job quality (Day *et al* 2019).

On the one hand, the use of CT has raised the efficiency of tasks and communication substantially (Ter Hoeven *et al* 2016) and has enhanced workers' autonomy over when and where to work. On the other hand, CT allows decision-making to be centralised and could thus be associated with less autonomy over how to do the work (Bloom *et al* 2014).

CT also increases expectations that workers will be available and accessible at any time (Leclerq-Vandelanoitte 2015), and leads to less predictable workloads and more frequent interruptions (Ter Hoeven *et al* 2016).

AI likely amplifies all of these existing effects from CT. For example, augmented reality-enhanced glasses that provide point- of-view footage during remote collaboration could facilitate human task coordination (Bal *et al* 2021).

But creating virtual office spaces using web3 applications may also exacerbate the always-on culture associated with digital communication technology.

Complete automation of task coordination using algorithms is widespread in online labour platforms, in particular localised gig work and online piece work. By automating the full coordination process between tasks done by different people in time-sensitive workflows (like ordering, preparing and delivering food), algorithms have taken over one of the key purposes of organisations.

No longer needing human coordination, platforms lead to the outsourcing of individual fragmented tasks to the market. These tasks often have low task identity; online piece work especially is often boring, repetitive or emotionally disturbing (Moore 2019).

Even though the lack of human management support may lead to a sense of isolation among some workers (Parker and Grote 2020), others may see this as an advantage. In Ivanova *et al* (2018) food delivery drivers described not having a boss ordering them around or monitoring them as a key benefit of working on a platform.

They also did not mind low task identity (ie. their work not being part of an organisational outcome), because this eliminates the emotional demands that come with dealing with customers or other workers in a hierarchy.

Contractual conditions are clearly impacted, as platform workers are often self-employed. This offers, in theory, greater flexibility in terms of workplace and time than standard forms of employment, but requires maintaining social security and insurance coverage independently.

Control over working time may be undermined by extremely low pay: while workers are in theory free to choose how much to work, in practice pay can be so low that many work permanently in order to make a living (Lehdonvirta 2018).

Moreover, since the volume of tasks assigned by the platform depends on demand and may fluctuate significantly from one day to another, self-employed platform workers may face significant job and pay insecurity (Lehdonvirta 2018; Parent-Rocheleau and Parker 2021).

The increased task fragmentation on platforms, and the quantification of tasks at the most granular level implies that only explicit and productive working time is paid.

By engaging workers only for the execution of a specific task, all preparatory labour that these workers may engage in to improve their reputations and ratings (eg. cleaning their car) or investments in skill development or infrastructure (eg. internet connection, computer setup) are unpaid, risking underpay and incentivising overwork (Moore 2019).

As labour demand under algorithmic task coordination grows, the use of precarious employment forms and zero-hour contracts may accelerate, excluding a growing share of the workforce from social security and other benefits of traditional employment (Moore 2019; PAI 2020; Parent-Rocheleau and Parker 2021).

Enabling task coordination at a global level may also give rise to the 24-hour economy, increasing commodification of labour (Moore 2019) and globally competing labour markets, placing further downward pressure on wages in high-income economies (Beerepoot and Lambregts 2015).

5 Improving technology design through worker participation and ethical principles

Technology is a product of power

The previously described effects of AI on job quality are not technologically predetermined but are the result of choices made by technology designers (AI developers) and job designers (managers) in response to economic, social and political incentives.

The absence of technological determinism for socio-economic outcomes was already elegantly argued by Heilbroner in 1967 and is widely accepted by now in the scientific literature (Vereycken *et al* 2021).

Therefore, harmful effects of AI in the workplace result from deficient design, arising either from unreliable data or the designer's intention in constructing the algorithm.

Much of the debate on biases in AI focusses on the data aspect: incomplete, non-representative or historically discriminatory patterns in datasets used to develop AI might perpetuate undesirable social outcomes.

Just de-biasing datasets, however, is not sufficient and policy responses should move beyond mere technocentric solutions and consider the wider social structures (including power structures) in which the technology is deployed (Balayn and Gürses 2021).

Even with unbiased datasets, technology development is a product of power in organisations and therefore replicates existing power dynamics in society. This power imbalance in technology development is apparent across gender and race, as big tech has a notorious lack of diversity (Myers West *et al* 2019).

But it is pervasive also across socio-economic classes, as highly educated managers and technologists source and design software to control workers at the bottom of the corporate hierarchy.

Pervasive data collection and algorithmic management applications are often implemented first in low-wage occupations characterised by low worker bargaining power (Parker and Grote 2020).

The adoption of those technologies further undermines power dynamics (Mateescu and Nguyen 2019a, 2019b), through deskilling effects, information asymmetry and lower efficiency wages[12] from surveillance.

As a result, disadvantaged groups in society suffer more of the negative consequences of AI. For example, workers of colour, and particularly women of colour, in retail and food service occupations, are exposed disproportionally to just-in-time scheduling (Storer *et al* 2019).

The resulting unpredictable schedules are harmful for health and economic security (Harknett *et al* 2021), increase hunger and other material hardship (Schneider and Harknett 2021) and have intergenerational consequences through unstable childcare arrangements (Harknett *et al* 2019).

Worker participation mitigates the negative consequences of AI adoption

Meaningful worker participation in the adoption of workplace AI is critical to mitigate some of this power imbalance. It cannot be left to individuals to comprehend, assess and contest the applied technology, so collective interest representation and unions have a critical role to play (Colclough 2020; De Stefano 2020).

Employee participation in the adoption process varies in terms of timing and influence (Vereycken *et al* 2021): workers may get involved during early-adoption stages such as application design or selection, or be limited to implementation or debugging, and their influence may range from sharing their opinions with management to formal decision-making rights.

The earlier workers are involved, the greater their say and the greater the chance that their perspectives are incorporated into new technologies.

At the very least, this can help to protect contractual working conditions. For example, Findlay *et al* (2017) described how

during the partial automation of a pharmaceutical dispensary, unions safeguarded workers' contracts and remuneration. Worker participation should extend beyond the adoption process to the co-governance of algorithmic systems.

Colclough's (2020) co-governance model follows the human-in-command principle and entails regular assessments that enable the identification of initially unintended consequences, and adjustments of the system to mitigate them.

Worker participation in technology implementation also benefits employers. Workers have a better understanding of their jobs than managers or technology developers.

Leveraging this specific knowledge about their jobs, what work they entail and how good performance can be assessed improves algorithmic system design.

For example, housekeepers knew that hotel guests preferred their rooms to be cleaned by the time they return in the afternoon, and therefore prioritised cleaning theirs over rooms of guests who had checked out.

However, the algorithm assigned rooms to maximise room turnover, so that staff were unable to clean the rooms of current guests in time, triggering complaints (Reyes 2018).

Similarly, bus drivers understood that their performance evaluation system's definition of 'good driving' was flawed, since a poor score from breaking abruptly can signal safe driving when reacting to avoid an accident (Pritchard *et al* 2015).

These misspecifications make algorithmic systems less useful to workers and undermine acceptance (Hoffmann and Nurski 2021) They also incentivise workarounds. Bus drivers, for example, would not activate the system when no passengers were on board, or would deactivate it briefly to prevent it from recording a traffic event (Pritchard *et al* 2015).

Similarly, according to Lee *et al* (2015), Uber drivers circumvented ride allocations by logging out when driving through bad neighbourhoods to avoid penalties from declining ride requests.

To sum up, worker participation can ensure that algorithms are not imposed on the workforce but adopted in collaboration with them, and that benefits are shared between employers and employees (Briône 2020).

Ethical AI principles that moderate AI's impact on job quality

Worker participation is not an end in itself, but a means to ensure that technology design incorporates features that mitigate job quality impact. Parent-Rocheleau and Parker (2021) highlighted three moderators in particular: transparency, fairness and human influence.

Clear explanations about why and how an AI system is used can mitigate adverse effects. Transparency over the system's existence, the rationale for using it and the process leading to an algorithmic decision (explainability) enhance workers' understanding of the algorithm governing their work.

Knowledge about the exact activities being monitored, for example, and what this data is used for, strengthens workers' work-method discretion by enabling them to organise their tasks around the features of the algorithm.

There exists no consensual definition of algorithmic fairness, but widely accepted elements include: 1) absence of bias and discrimination, 2) accuracy and appropriateness of decisions, 3) relevance, reasonableness or legitimacy of the inputs into decision-making, and 4) privacy of data and decisions (Parent-Rocheleau and Parker 2021).

The examples in section 4 illustrate how violations of these principles undermine job quality and worker acceptance of algorithmic management. Biased customer ratings introduce discrimination to performance evaluations (Rosenblat *et al* 2017) and public worker rankings undermine team morale (Gutelius and Theodore 2019).

The failure to account for road conditions and the quality of vehicles led to inaccurate performance scores for bus drivers in London, causing overarching suspicion of the system's reliability (Pritchard *et al* 2015).

Moreover, perceptions of organisational fairness in the workplace are situation-dependent, as illustrated in a case study by Uhde *et al* (2018) of a fair scheduling system in the healthcare sector, and highlight the importance of human rather than algorithmic intervention in resolving conflicts.

Empowering workers to exert control over an algorithmic system, for example by intervening in algorithmic decisions (eg. switching shifts with co-workers or declining tasks without penalty), overriding its recommendations or commenting on the collected data, safeguards worker autonomy and helps to overcome initial aversion to algorithmic governance (Parent-Rocheleau and Parker 2021).

Even before its full deployment, a participatory approach in system design that allows workers to give feedback or to influence the choice of parameters factoring into decision-making, will establish a sense of control.

Regardless, meaningful human influence requires transparent and effective appeal procedures that empower workers to question, discuss or contest algorithmic decisions, and ensure human responsibility for decisions.

Transparency, fairness and human influence are common principles in AI ethics that extend beyond the scientific literature to policymaking. Other important principles at a global level include non- maleficence, accountability and privacy (Jobin *et al* 2019).

The OECD adds *"robustness, security and safety and inclusive growth, sustainable development and well-being"* (OECD 2019), and the EU's high-level expert group on AI has determined *"respect for human autonomy, prevention of harm, fairness and explicability"* to be the four guiding principles to ensure 'trustworthy' AI (AI HLEG 2019).

6 Policy recommendations

Three European Union legislative initiatives are relevant in the context of AI and job quality: the general data protection regulation (GDPR (EU) 2016/679), the proposed AI Act (a product-safety regulation; European Commission 2021a), and the proposed platform work directive (a labour regulation; European Commission 2021b).

As a privacy regulation, the GPDR affects mainly the monitoring and surveillance aspects described in section 4. In addition to regulating personal data collection, the GDPR also ensures the right not to be subject to fully automated decision-making.

Exceptions to this rule, however, weaken its application in the employment context, for example when automated decision-making is required to enter into or enact a contract (De Stefano 2020). And, although the GDPR safeguards the right to contest algorithmic decisions, this protection is meaningless to workers unless they can demonstrate the violation of an *"enforceable legal or ethical decision-making standard"* (De Stefano, 2020, p.78).

Without enforceable ethical standards that workers can leverage, meaningful appeal is not safeguarded. Finally, as a privacy regulation, the GDPR accounts primarily for data input, but many adverse consequences of algorithmic management only emerge from data processing and inference once data is collected legally (Aloisi and Garmano 2019).

While the proposed AI Act has a broader focus that just the workplace, it does list employment as one of the eight high-risk areas that will be subject to strict requirements for providers and users, such as ex-ante impact and conformity assessments. From the perspective of this paper, the proposal has the following crucial gaps.

First, it is unclear how the roles of providers and users would translate to the workplace where there would be more parties involved (ie. the developer, the employer and the employee).

While the proposal states that employees should not be considered users (see §36), it is unclear how the responsibilities are shared between the developer of the system and the employer.

Developer and employer could be two different parties, if the system is sourced from the market, or the same party, if the system is developed in-house.

Second, self-assessment by the provider of high-risk AI systems is not sufficient in the context of the workplace because of existing power imbalances between employers and employees (De Stefano 2021).

Worker representation and trade unions should be involved in order to assess correctly the potential risks associated with the system. Yet, the proposed regulation does not mention the role of social partners in shaping the use of AI systems at work (De Stefano 2021).

Third, the risks discussed in the proposed AI Act are expressed in terms of risks to health, safety and fundamental rights (see Article 14). As illustrated in this paper, risks from AI systems in the workplace also include threats to mental health, work stress and job quality in all its aspects (including precarious conditions, isolation and control).

De Stefano (2020) made the case for considering workers' rights in fundamental rights, making labour protection an important tool to safeguard human rights, in particular human dignity, in the workplace.

In contrast to the AI Act, the proposed EU platform work directive is in fact a labour regulation and therefore does emphasise labour relations in this context. Chapter III on algorithmic management is applicable to all persons working through digital platforms, regardless of their employment status (self-employed or employee).

Articles 6 (on transparency), 7 (on human monitoring of automated decisions), 8 (on human review of decisions) and 9 (on worker consultation) correspond more or less to the design principles discussed above on transparency, fairness and human influence, and the mechanism to achieve these principles through worker participation.

However, the fairness aspect could be strengthened in the text. For example, Article 7 requires platforms to evaluate the risks of accidents, psychosocial and ergonomic risks, assess the adequacy of safeguards and introduce preventive and protective measures.

Other unfair effects of algorithmic management on job quality, such as redefinitions of paid work time or imbalanced performance evaluations, could be included here as well.

Finally, algorithmic management in various forms is already pervasive outside of platform work (as documented in section 4). We therefore urge the European Commission to regulate this practice also in traditional sectors of the economy.

In addition to the above comments on ongoing legislative initiatives, we leave some general concerns about the potential impact of AI on job quality. First, there is a risk of increasing polarisation in job quality, as existing occupational and socio-economic status differences are reflected in the way new technologies are designed and thus exacerbate power imbalances in the workplace.

Second, policymakers and employers need to look beyond working conditions into job design (job demands and resources) to understand the full impact of AI on job quality.

Third, different use cases of AI in the workplace have different effects on job quality, but in general, the more prescriptive the use case, the greater the harm to job quality.

Finally, ethical design choices, both in technology design and job design, matter very much and can mitigate many of AI's potentially harmful effects. ■

Endnotes

1. Other definitions are in use among policymakers (eg. the OECD AI expert group (OECD, 2019) and the definition used in the proposed EU AI Act (European Commission, 2021a)), but most of them overlap to a large extent.

2. See for example Fayol (1916), Gulick (1937) and Koontz & O'Donnel (1968).

3. Cole and Kelly (2011) defined management as "enabling organisations to set and achieve their objectives by planning, organising and controlling their resources, including gaining the commitment of their employees (motivation)".

4. Martela (2019), based on Puranam (2018), defined the "universal problems of organising" as division of labour (task division and task allocation), provision of reward (rewarding desired behaviour and eliminating freeriding) and provision of information (direction setting and coordination of interdependent tasks).

5. Work method autonomy: the degree of discretion/choice individuals have regarding the procedures/methods they employ in going about their work. Work scheduling autonomy: the extent to which workers feel they can control the scheduling/sequencing/timing of their work activities. Work criteria autonomy: the degree to which workers can modify or choose the criteria used for evaluating their performance (Breaugh, 1985).

6. Respectively questions Q54B, Q54A/C and Q61C on whether workers can choose or change the methods of work, the order and speed of tasks, and the objectives of their work.

7. See for example Bogen and Rieke (2018), Whittaker et al (2019) and Sánchez-Monedero et al (2020).

8. In 2017, four in 10 workers in the EU performed their work sitting down, ranging from 21 percent in Greece to 55 percent in the Netherlands (source: Eurostat dataset ILC_HCH06). Excessive sitting is associated with health risks including obesity, cardiovascular disease and back pain.

9. We discuss the implications of such incentive systems to shape behaviour in the next section Algorithmic surveillance, evaluation and discipline.

10. See the next section on Algorithmic surveillance, evaluation and discipline.

11. For a more extensive discussion of the use of artificial intelligence technologies to improve health and safety, see Hoffmann and Mariniello (2021).

12. Economic Efficiency Wage Theory assumes that firms pay wages above market clearing levels to increase productivity (when effort cannot be observed or monitoring costs are too high) or reduce employee turnover (when it is expensive to replace employees that quit their job).

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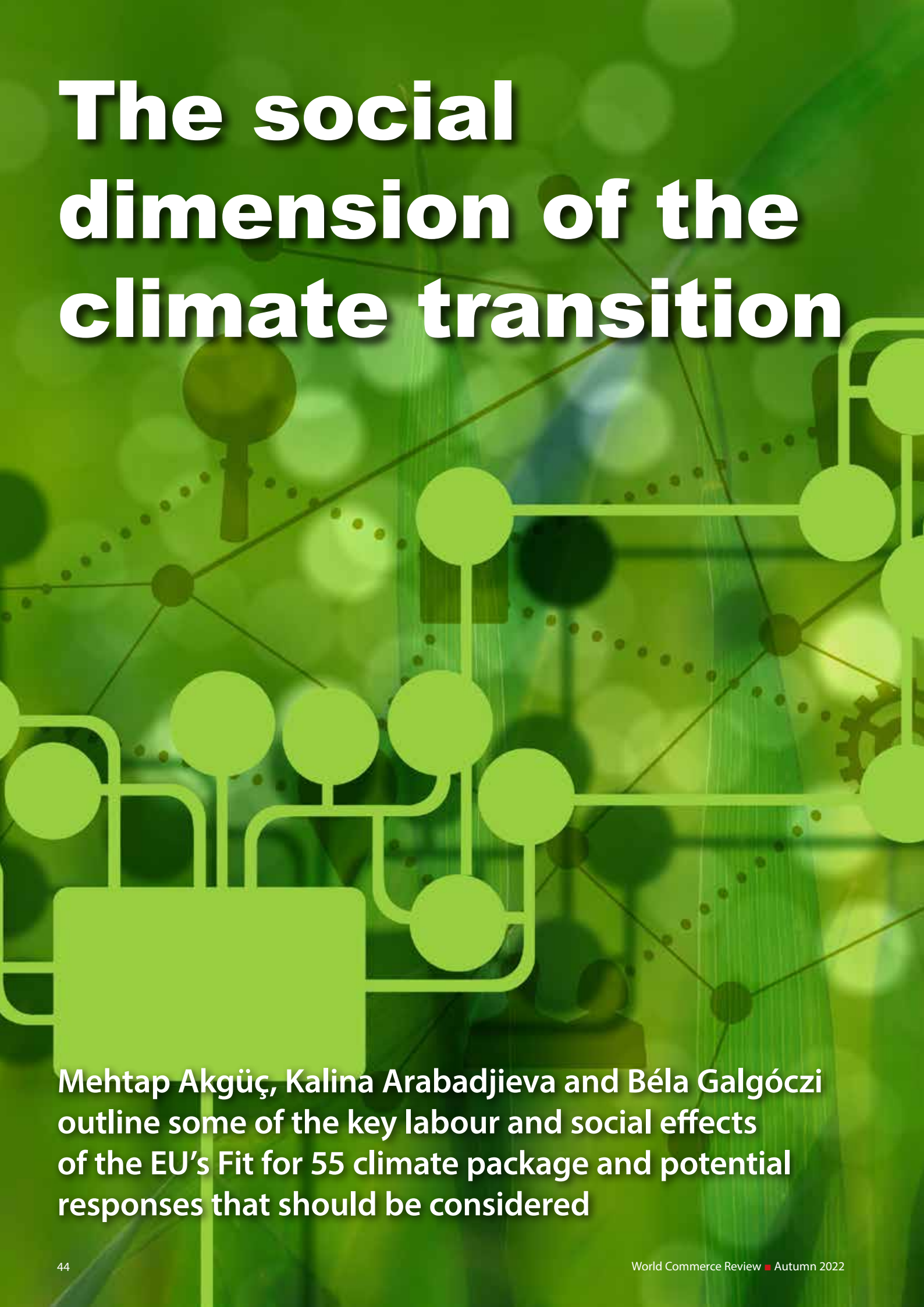
The social dimension of the climate transition



Mehtap Akgüç, Kalina Arabadjieva and Béla Galgóczi outline some of the key labour and social effects of the EU's Fit for 55 climate package and potential responses that should be considered

As well as the inclusion of the notion of just transition into the preamble of the 2015 Paris Agreement, and then in the Glasgow Climate Pact, employment and distributional aspects of climate change mitigation have been recognized at the highest policy level of European union. This can be seen as a modest but important achievement of a several decades-long campaign for a just transition by the labour movement.

The announcement of the European Green Deal (EGD)[1] in 2019 had already included pledges to 'leave no-one behind.' The Just Transition Mechanism[2] and the proposed Social Climate Fund[3] are some of the main EU measures announced to date intended to mitigate the impact of the transition on the most affected regions, vulnerable individuals and businesses.

The Council Recommendation on the social and labour aspects of the climate transition, which is not legally binding, has also provided guidance to member states on how to ensure that the green transition takes place in a just and fair way.

This is a huge challenge that spans across many questions, such as the distributional effects of decarbonization policies, jobs losses and employment transitions, the protection of basic social rights and inclusion of citizens in decision-making, to name but a few.

By no means should this instrument be seen as a substitute for strengthening the social dimension of EU legislative and policy measures on climate change. Nor should it give reason to lower climate ambitions – a 'just transition' does not mean 'slow transition.'

A just transition for the EU can only be 'just' in a true sense if it goes with maximum climate ambition, particularly given Europe's historical debt to low carbon footprint developing countries.

With this in mind, we outline some of the key labour and social effects of the EU's Fit for 55 climate package[4] on the EU population and potential responses that the recommendation should consider.

Employment effects

Climate policies are having and will continue to have a major effect on the world of work. Millions of new jobs are being created in the transition to a net zero carbon economy, but a large number of jobs will also disappear.

The majority of jobs will go through a fundamental transformation. This unprecedented wave of restructuring will have unequal effects on many fronts, including skills, gender, age, economic activity and region. Sectoral differences are particularly high.

The energy and automotive sectors will be the ones most affected by the decarbonisation drive from climate and environmental regulations at European and national levels. While coal has no future and coal-dependent jobs will be gone, the automobile does have one, albeit in quite a different form from the one we know.

"Inclusive and comprehensive social and economic policies are essential to securing social justice, resilience and sustainability"

In the coal-based power sector the majority of currently existing jobs will disappear in a decade and the regional effects will be harsh[5], as over 90% of coal jobs are concentrated in ten NUTS 2 regions, four of them in Poland.

With a more than 5% share of total European employment, the automotive sector is a key employer. For the car industry, the demise of the combustion engine and the electrification of the powertrain will require the development of new competences, skills and forms of work organisation.

These will have a substantial impact on the comparative advantages held by certain nations and manufacturers[6]. The renewable energy sector, construction and low-carbon infrastructure are expected to deliver most of the job creation[7].

However, transitional policies should consider the local dimensions of the transition - the places where jobs are lost and created are not necessarily the same and relocating labour is not straightforward.

Jobs and skills

Climate change policy will have a major impact on jobs, their skill contents and how they are performed. The transition will come along with increasing demand for skills in the renewable and cleaner energy sector, energy and resource efficiency, digital competences, STEM knowledge to trigger innovation and breakthrough technology, greener construction methods, city planning and design, technical competences in adaptation, waste management, maintenance and repair technologies to reduce resource exigency as well as boost circular economy practices, to name a few[8].

To match the rising demand in specific skills and competences for the green transition, training programs and education curricula need to be adapted to the needs of the labour market. Public sector and businesses could cooperate to adapt the training and education programs.

Training, reskilling and upskilling should be made available to the wider workforce and in a flexible format to the extent possible (eg. online or flexible hours) to ensure that nobody is left behind and attract new talents to green jobs, avoiding skill gaps.

Working time and work conditions will also be impacted by climate change and environmental degradation. For example, extreme and frequent heatwaves will necessitate reorganization of working time in key sectors or equipment of air conditioners will be needed to provide appropriate health and care services in regions experiencing adverse climate effects[9].

Distributional effects

Effective climate policies can only be based on a comprehensive policy framework that include regulation, standards, taxes and market mechanisms in a balanced manner. While market mechanisms – such as the EU's Emissions Trading Scheme[10] - that set price signals to market actors are one important element of this in changing investment and behavioural patterns, they can only have the desired effects in well-functioning markets, but current energy markets are far from that.

Moreover, the signals themselves have significant regressive distributional effects, disproportionally affecting low-income households, for whom fuel and transport consumption make up a higher share of their income[11].

Poorer households also have less capacity to change, as while low-carbon products (electric vehicles, rooftop solar panels, and so on) may have low operating costs, they tend to have high, upfront capital costs – presenting a hurdle for households with little access to cheap capital.

Certain vulnerable groups are likely to be affected more than others during the transition. For example, climate change induces gendered effects as men are disproportionately employed in polluting sectors. This can imply mitigating effects for women: while it can result in overall poverty for the household as men lose jobs, it might also encourage women to enter into the labour force for paid employment – yet with concerns about job quality – to support household income.

However, there is also wide evidence pointing to disproportionate vulnerabilities – such as having fewer resources at disposal, reduced access to education as well as being frequently excluded from information and decision-making processes – faced by women during green transition[12]. Just transition must mean also empowering women and addressing these structural inequalities.

Another group experiencing vulnerabilities is migrants. For one, most of the foreign-born workers are employed in relatively low-paying and polluting sectors and have no or only limited access to training to upskill towards transition to low-carbon economy[13].

The other aspect relates to the future – both internal and international – migratory movements towards Europe as a result of climate emergency. Both of these aspects point to the importance of targeted social and labour market policies to manage flows, ensure successful socioeconomic integration and just transition for everyone including migrants.

This would contribute to global climate justice as the ones most adversely impacted by climate change are not the main contributors to it.

Fundamental rights

The environmental, social and economic effects of climate change and related mitigation policies threaten the enjoyment of fundamental human rights[14]. These include basic social and economic rights, widely recognised in

international and European human rights instruments and national constitutions[15]. They constitute entitlements to basic conditions for a decent human life, without which it is impossible to speak of a 'just' transition.

Both the distributional and employment consequences of climate change policies could affect various basic rights such as the right to work, the right to just working conditions, the rights to an adequate standard of living and to protection from poverty and social exclusion.

As the burdens of the transition fall disproportionately on those who are already most vulnerable, disparate impacts of policies along the axes of gender, ethnicity, migrant status, disability or other protected status could impinge on the right to equality and non-discrimination.

Threats to fundamental rights in global supply chains arise in the context of delivering the resources and technology necessary for decarbonisation[16].

At the same time, fundamental rights can provide a normative framework for the basic elements – necessary but not sufficient – of just transition policy.

Aside from the rights mentioned above, ensuring respect for rights to vocational training, fair remuneration, social security, equal opportunities, and collective bargaining – and others – could constitute the foundations of a strategy to address the impacts of the green transition on workers and citizens more broadly.

Discussion of fundamental rights is, however, largely absent from the European Green Deal and Fit for 55 packages. Reference is made to the European Pillar of Social Rights[17], a list of 20 principles without binding legal effect. There is no mention of the EU's own Charter of Fundamental Rights[18], nor other international legal norms.

The Recommendation could be an opportunity to strengthen the link between the just transition agenda and long-standing frameworks for the protection of fundamental labour and social rights, such as the European Social Charter or the core Conventions of the International Labour Organization.

Citizen participation

Climate protest movements such as Fridays for Future, as well as the tens of thousands of people who took to the streets during COP26 make clear that citizens want to have their voices heard when it comes to climate change.

A key challenge for a procedurally fair green transition is to ensure that the public, and especially the most affected communities and citizens, have an opportunity to participate in decision-making.

Participation is a means to empowering and fostering cooperation with affected communities, and contributing to better outcomes and increased democratic legitimacy. In the labour context, this means meaningful participation by workers and social dialogue.

Climate citizen assemblies, convened in France, the UK and some other European countries over the last years are gaining popularity as a forum for public debate on climate change. The on-going Conference on the Future of Europe includes a panel on climate change, too.

But simply providing a forum is not enough – decision-makers also have to listen. Transparency, information and capacity-building are crucial to meaningful involvement, as are active steps to include marginalised groups and to ensure diversity across factors such as gender, ethnicity, age, socio-economic status or geographic location.

The way forward

Getting climate change under control is in the interest of humanity, the unprecedented restructuring process economies need to go through in a few decades to reach net zero emissions is policy driven.

These policies will have differential effects on people with different socio-economic characteristics, and policymakers have a dedicated responsibility to address these.

A just transition means that addressing both the employment and distributional effects of a transition to net zero should be an integral part of the package and not supplementary corrective measures.

The EGD has recognised this, but in practice social and employment policy initiatives have remained fragmented and additional. This shortcoming has become very clear with the announcement of the Fit for 55 package in July 2021.

Europe now has a Just Transition Fund with limited resources, dedicated mostly to helping coal regions manage the social and employment effects of coal phase-out. This is very important but reaches a small fraction of people affected by decarbonisation.

The newly announced Social Climate Fund has a very specific target, namely to fend off the detrimental distributional effects of a new emissions trading system for buildings and transport, but even for that it may not be enough[19].

Sectors that are highly affected, the automotive sector and energy intensive industries do not have dedicated instruments and a fund.

European-level labour market and social policy initiatives should provide guidance to member states to manage change, and the proposed Council Recommendation is one way of doing so.

In this context, 'leaving no-one behind' should be more than a slogan and translate into concrete measures. Contrary to the declarations, just transition policies are not yet an integral part of the European Green Deal agenda and of the more concrete Fit for 55 policy package.

A comprehensive just transition policy framework should include the following elements:

1. Support for workers in the transition to new jobs with measures targeted to specific sectors (automobile, energy intensive industries, etc.) tailored to national and regional specifics.

2. Deal with the distributional effects of climate policies with targeted measures against energy and transport poverty, supporting and facilitating the affordability and accessibility of low carbon technologies to lower income households (retrofitting of buildings, access to renewable energy, vehicle fleet change, developing public transport).

3. Regional development initiatives to help carbon intensive regions towards a sustainable low-carbon economy.

4. Promote social dialogue and stakeholder involvement at all levels (EU, national, regional and plant level) in managing change towards a zero-carbon economy, including meaningful involvement by citizens.

5. Make sure that newly created green jobs are also good jobs in terms of contract type, social security, wages and working conditions in line with the ILO decent work agenda.

Today a large part of the workforce is in fear of change, a concern that is justified in a labour market environment characterised by increasing precariousness.

As long as 'change' remains fearful, the biggest transformation since the industrial revolution ahead of us cannot succeed. Inclusive and comprehensive social and economic policies are therefore essential to securing social justice, resilience and sustainability. ■

ABOUT THE AUTHORS

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Endnotes

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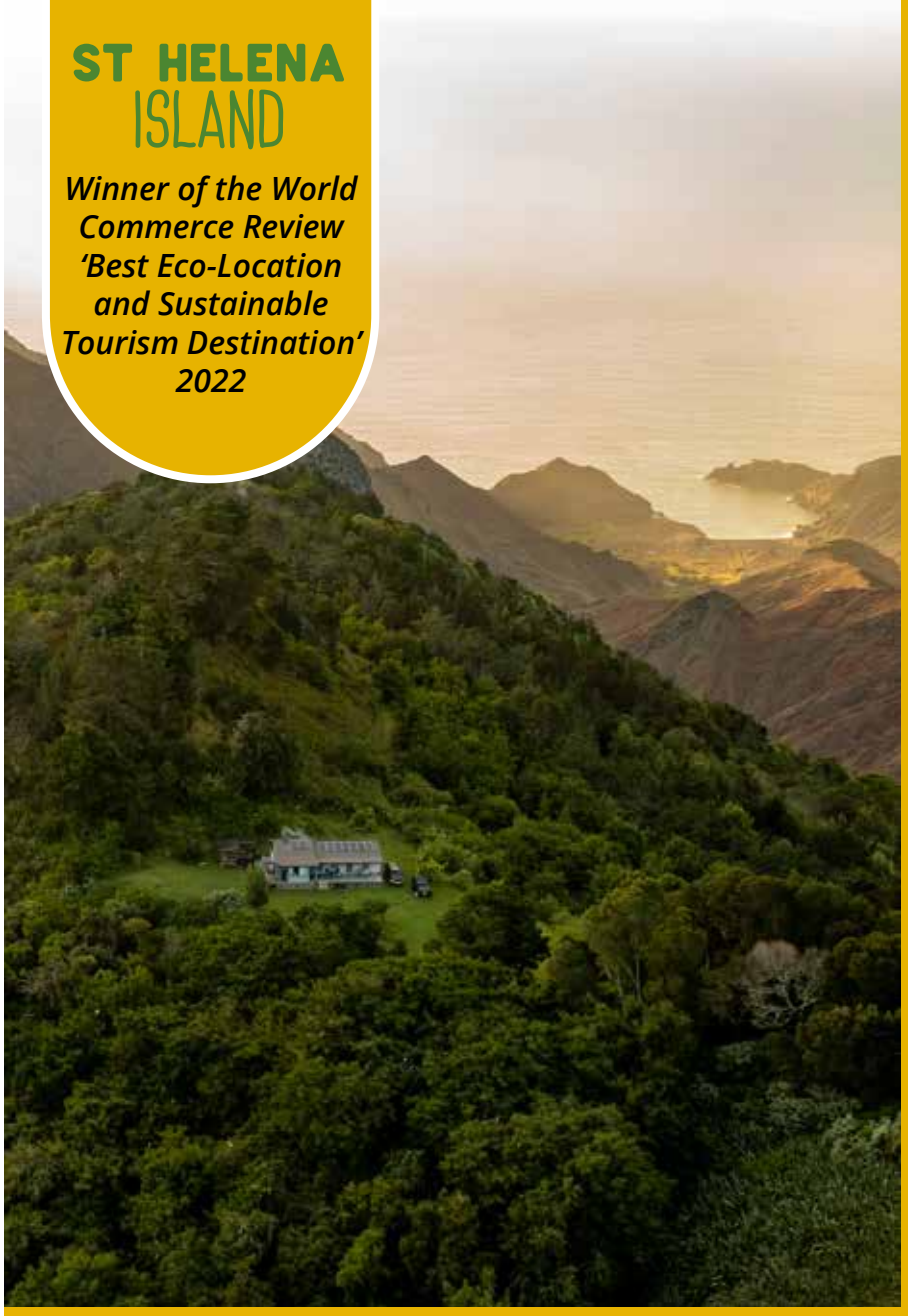

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Achieving net zero emissions

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Climate change is transforming the global investment landscape, creating new risks and opportunities. Physical risks, from rising sea levels to the lethal heat waves scorching Europe and elsewhere, affect asset values for everything from stocks to real estate and infrastructure. So-called transition risk—including government policies to reduce greenhouse gas emissions—lowers the value of fossil fuel companies.

To evaluate these risks and support the transition to a low-carbon economy, investors and others in the financial world need information. For example, they may want to know if a company's assets are physically vulnerable, the volume of greenhouse gases it emits, and what its plans are for lowering emissions.

In addition, heightened geopolitical risks, notably due to Russia's war in Ukraine, and the deterioration of the global economic outlook[1] may make the transition to a low-carbon economy more complex, expensive and disorderly.

Energy policy decisions could also be affected by the amount of carbon lock-in—which occurs when fossil fuel-intensive systems perpetuate, delay or prevent the low-carbon transition—that is generated in the near term, including by a delayed phase-out of thermal coal.

Data deficit

Currently, however, financial market participants face a lack of high-quality, reliable, and comparable data needed to efficiently price climate related risks and avoid greenwashing—spurious attempts by financial or non-financial companies to burnish their environmental credentials.

This data deficit poses a serious obstacle to the energy and ecological transition, which requires migrating capital toward low-carbon industries and massive new investments in mitigation and adaptation.

It also makes it more difficult for financial supervisors to assess risks to financial stability given uncertainties and challenges to quantifying climate-related impacts. Therefore, policymakers urgently need to ensure that better climate data are made available.

A new report[2] from the Network for Greening the Financial System takes an important step. It features a directory[3] that evaluates available climate data, identifies gaps, and offers practical, concrete ways to close those gaps.

The report, a product of a working group co-chaired by the IMF and the European Central Bank, strengthens what we call climate information architecture. This has three building blocks[4]: high quality, comparable data; global

disclosure standards; and climate alignment approaches and methodologies, including taxonomies of assets and activities.

The report makes three contributions. First, it highlights that, despite the substantial progress on the climate data front since COP26[5], challenges remain, including:

- Insufficient coverage in disclosures of non-publicly listed companies and small and medium-sized companies
- Limited availability of comparable and science-based forward-looking information, such as targets, commitments, and emissions pathways, that are needed to assess physical and transition risks
- Auditability is needed to build trust and enhance the quality of data, yet it remains limited

Second, the report makes tangible policy recommendations:

- Foster convergence toward common and consistent global disclosure standards, for example by increasing availability of granular emissions data and improving the reliability of reported climate-related data
- Increase efforts toward shared principles for taxonomies, for example by increasing the linkages between taxonomies and disclosures
- Develop well-defined metrics and methodological standards, for example by better harmonizing forward-looking metrics and reinforcing public and private cooperation to improve methodologies
- Better leverage available data sources, approaches, and tools, for example by improving use of new technologies

"Banks, pension funds, and other investment firms need better climate data to assess risks"

The third and most important contribution is the climate-data directory, which surveys available data based on the needs of the financial sector and how information is used.

For example, banks, pension funds, and other investment firms apply scenario analyses and stress testing to analyse climate-related risks from individual securities and companies themselves, in combination with credit ratings.

They need climate-related data to assess vulnerability to these risks at the sector, company, household, and sovereign level, and to evaluate the determinants of physical risks and transition risks.

Policymakers may need other data to determine whether a sharp drop in asset prices could hurt balance sheets of financial companies, putting financial stability at risk.

Climate data directory

The climate data directory can shape evidence-based conclusions on the main data gaps. For example, it shows where raw data aren't available to construct metrics such as the exposure to climate policy relevant sectors, or the share of assets such as coal-fired power plants in energy portfolios.

Missing are accounting data and exact geographic location of assets, as well as data on greenhouse-gas emissions and effects related to biodiversity, forest depletion, floods, droughts, and storms.

Though not offering direct access to underlying data, the directory is a public good, a living tool aimed at better disseminating climate-related data and offering practical solutions to bridge data gaps.

It's designed to help financial professionals identify relevant sources to meet their needs, facilitate access, and better disseminate existing climate-related data. It can play a decisive role in fostering progress on the four policy recommendations described above.

The report's findings and accompanying policy recommendations line up closely with the IMF's work on climate data, disclosures, and taxonomies and other methodologies intended to align financial portfolios with Paris Agreement goals.

Metrics and methodologies

For example, the Fund's Climate Change Indicators Dashboard[6], a statistical initiative to address the growing need for data used in macroeconomic and financial stability analysis, may benefit from the directory's improved metrics and underlying methodologies.

The IMF is also leading a joint project[7] to provide guidance on the Group of Twenty's high-level principles[8] for taxonomies and other sustainable-finance alignment approaches. This work is particularly relevant for emerging market and developing economies, which face considerable challenges in reducing greenhouse-gas emissions and attracting private capital to finance the transition.

The IMF participates in the International Financial Reporting Standards Foundation's new standard-setting board[9] for sustainability and climate disclosures, which plays a key role in such work.

It also co-leads the Financial Stability Board's Climate Vulnerabilities and Data workstream[10] to incorporate climate in the organization's regular vulnerabilities assessment.

These efforts aim to address areas of concern in climate vulnerabilities, metrics, and data based on their materiality and their cross-border and cross-sectoral relevance. Finally, the IMF has started to include climate-related risk analysis[11] in its financial sector assessment programs[12].

Late last year, the IMF dedicated its annual statistical forum to gauging climate change[13] and discussed with other international bodies how to close climate finance data gaps.

And in October, we will publish an analytical chapter of the *Global Financial Stability Report* that takes a more in-depth look at financial markets and instruments in scaling up of private climate finance in emerging market and developing economies. ■

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This article is based on an IMF blog

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India's climate action

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In 2015, 193 countries committed to 17 Sustainable Development Goals (SDGs). The term 'sustainable development' has gained immense popularity in India's policymaking circle in the last decade.

It received a renewed push with the Honourable Prime Minister of India Narendra Modi unveiling India's *Panchamrit* plan at the 26th session of the Conference of the Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC), putting environment and sustainability centre stage.

With 17 per cent of the world population, India is a large country and therefore justifiably, the government is particularly focussed on ensuring reduction in carbon emission and creating a green economy with a renewed vigour and interest.

However, India's commitment to net zero emissions by 2070 cannot just be a political aspiration; it also has to be a collective objective of the local governments, the industry in particular, and the people as a whole.

When broken down, the nation has before it two key responsibilities. The first is to ensure that the industry and the public imbibe the principles of sustainable development into their everyday choices and into business as usual, and this is where environment, social, and governance (ESG) principles play a key role.

Second, to develop a vibrant financing model that will help fund the necessary changes that will have to be made by industry.

Today, the role of ESG in the context of Indian business ecosystem has gone beyond the role of an extension of the corporate social responsibility (CSR) mandate.

This said, the first step towards adoption of ESG reporting was pushed by the Ministry of Corporate Affairs through the National Voluntary Guidelines (NVGs) on Corporate Social Responsibility (CSR) in 2009 and continued till the Securities Exchange Board of India (SEBI) mandated the filing of Business Responsibility Report (BRR), and from May 2021 the Business Responsibility and Sustainability Report (BRSR), a standardised reporting format in line with the global ESG reporting metric system, that replaced the BRR.

Despite its implementation, the efficacy of ESG ratings have often been questioned. A wide range of literature suggests a positive correlation between superior ESG ratings and financial valuations.

The ambit of ESG ratings is wide, varying from broad social and environmental issues to more localised issues around ensuring workplace diversity. Evidence suggests that investors demand higher yields for bonds with heavier carbon footprints and social bonds denominated in the US dollar or the euro have been issued at a price premium compared to standard bonds (Scatigna *et al* 2021)[1].

Janicka and Sajnóg (2022)[2], in their study concluded that public companies in the European Union undertaking ESG reporting have better financial performance than those not undertaking ESG and tend to be valued higher by the market.

Investors are also more interested in investing in companies that are more ESG conscious. Investors believe that companies that are more conscientious about their strategies are better prepared for long term sustainability.

In the last two years, the pandemic has acted almost as a litmus test. Not surprisingly, companies with better ESG rankings performed better in the last two years, validating the hypothesis that companies with better ESG ratings are indeed better prepared for force majeure events.

This was the case in both Europe (Englehardt *et al* 2021)[3] and in India too (Beloskar and Rao, 2022)[4]. It is therefore no surprise that ESG ratings in India are also growing at a rapid pace. Bloomberg estimates that by 2025, one-third of total AUM would be ESG investments. The value of these investments is pegged at US$53 trillion by 2025[5].

Despite its rapid growth into the mainstream, the rise of ESG investing has been neither smooth nor linear. Since its very inception, ESG investing has been critiqued and challenged by investors and companies alike.

It was first questioned by the institutional investors themselves who argued that adherence to ESG guidelines will impact their fiduciary duty of maximising the value of shareholders irrespective of social, environmental, or broader governance issues.

However, with the rising concerns and awareness around climate and social issues, such arguments have been put to rest.

Another common criticism has been on the lack of standardisation in the definition of ESG parameters and in the rating methodology. Billio *et al* (2020)[6] argue that this lack of standardisation mitigates any positive impact on the financials of the company.

There also exists a counter (and fair) argument to standardisation, that suggests that bringing in uniformity will enforce a one-size-fit-all framework across countries, which may be detrimental to many developing countries.

For India, finding this balance will be crucial and challenging to achieving the desired success in meeting the SDG goals.

Interestingly, in India, the impact of ESG ratings across company sizes is yet unknown. The Indian industries comprise of a large number of micro, small, and medium enterprises (MSMEs). The compliance burden on these companies is already high. Introducing ESG compliance may increase their burden rather than do any good.

This would also, therefore, have an impact on their access to capital. Furthermore, there is no conclusive data to suggest that ESG ratings have any real on ground impact on environmental and social parameters, notwithstanding the fact that the impact on these parameters are a lot more difficult to compute than governance parameters.

Even so, the investment potential in India is enormous. According to a Standard Chartered report[7], the potential for private sector investments in order to meet the objectives laid down by India for SDGs 6 (water and sanitation), 7 (affordable and clean energy), and 9 (industry, innovation, and infrastructure), by 2030 is a whopping US$1.124 trillion.

By comparison, for China, the amount is US$2.828 trillion and for Bangladesh it is US$132 billion for the same SDGs. Broken down into its components, by 2030, India will require investments to the tune of US$1.558 trillion for universal access to power, US$377.4 billion for universal digital access, US$505.5 billion for sizeable improvements in the transport sector, and US$192.2 billion for universal access to clean water and sanitation.

This translates into an investment potential of US$701.5 billion for power, US$226.5 billion for digital access, US$176.9 billion for transportation and US$19.2 billion for clean water and sanitation.

When it comes to financing sustainable development, India began her journey in 2015 with the issuance of the first green bond by Yes Bank at 8.85 per cent for INR 1,000 croroe (US$149,252,731) for developing infrastructure.

"The Indian government should make every effort in creating the necessary policy environment and enabling regulations to collectively push industry, civil society, and all policy agencies in one direction"

The impact of the green bond, despite being a success in Europe and North America, was muted. The bonds were completely subscribed to by the International Finance Corporation (IFC). Anecdotal evidence suggests that there was no significant pricing advantage for either the issuer, Yes Bank in this case, or to the borrowers whose projects were invested in.

India's green, social, sustainability (GSS) debt issuance increased more than six-fold (+585 per cent) to reach US$7.5 billion, with 89 per cent in under green theme in 2021 following a pandemic-induced decline in issuance in 2020. Cumulative volume has almost doubled in the last two years to represent US$19.5 billion in value.

It was therefore not surprising that the green bonds issuances in India in 2021 was exceptional and set a new record in 2022. India issued US$6.3 billion of green bonds in 2021. It was the strongest issue since the first issue in 2015.

Of these, US$6.3 billion was raised through green bonds targeting renewable energy, US$85 million towards low carbon buildings, and US$20 million towards water management. Several 2021 Climate Bonds Certified deals also financed renewable energy projects, particularly solar and wind.

These were issued by Azure Power Energy (US$414 million), Power Finance Corporation (€300 million/US$352 million), Renew Power (US$1 billion) and Vector Green Energy (INR 12.37 billion/US$166 million)[8].

Between September 2021 and February 2022, Adani Green Energy along with its three subsidiaries had raised a total of more than US$1.21 billion through domestic (rupee denominated) and overseas (dollar denominated) green bonds[9].

The Finance Minister of India Nirmala Sitharaman, while presenting the Union Budget 2022-23, announced the proposal to issue sovereign green bonds worth INR 24,000 crore (~US$3.3 billion) to push green financing initiative in India. The sovereign green bond is expected to fund India's net zero emission by 2070 commitment.

This will be a big step for India, especially amongst the BRICS nations, as India will be the first country to issue such a bond.

The green bond can be an effective tool for supplementing the renewable energy market with long term cost of capital.

This said, the government is yet to clarify on the quantum of bonds, the markets and, currencies in which they will be issued.

Some of the major factors that the government would need to consider is the tenure of the bond (typically green bond tenures are at least 15 years), the currency of issue, and how to attract the retail investor. While in most western countries, green bond issuances have been oversubscribed, in India this has not necessarily been the case.

India grapples with the same constraints as the rest of the world when it comes to green bonds. Definitions, or their lack thereof, have led to a great deal of confusion over what is and can be considered green.

CICERO, a second party reviewer of green bonds, offers 'shades of green' methodology, through which green bonds are graded 'dark, medium or light' green depending on the underlying project's contribution to *"implementing a 2050 climate solution."*

There is no fixed definition or binding carbon standards. This has kept some mandated green investors away, who prefer to do their own due diligence, thus raising the cost of investing and monitoring.

Issuers face reputational risk and potential accusations of 'greenwashing' if proceeds are not used for their intended purposes or if issuers are unable to prove that proceeds have funded projects with a positive impact.

Furthermore, infrastructure companies in India have not always had a good credit history to command the highest rating. In addition, apart from the biggest names in the power generation sector, viz. NTPC and Tata power, no other company has the credit rating to be able to issue bonds in the capital markets.

Due to the nature of the business, power generation is very capital intensive and relies heavily on debt for funding, which further hampers new companies from being able to raise debt in the capital markets.

With the sovereign green bond in the pipeline, policymakers may want to replicate the German 'Green Twin Bonds' which are identical to conventional bonds in terms of maturity and coupon rate but with a smaller issue volume compared to conventional bonds.

Another important step would be to develop a uniform framework with metrics to identify and categorise green projects. Such a metric should further consist of parameters to determine the quality of a green project (light green, deep green etc.).

Policymakers must develop a methodology to evaluate the impact of a green projects and publish such analysis in a timely manner to create transparency for investors and public. This would also promote investor confidence in the market and help such projects to access further funds in future.

The funds raised through Sovereign Green Bonds must be available to both the public sector as well as the private sector, even if that entails strict scrutiny of ESG parameters and Environment, Health, Safety (EHS) standards of the project to be considered as green.

For power projects, especially clean energy projects (including wind, solar, hydrogen etc.), state governments must fix Power Purchase Agreement (PPA) prices in the long run and must avoid frequent policy changes to such agreements.

Policymakers in India should consider setting up a specialised institution backed by the Government or supported by a third-party agency to act as a guarantor for corporates issuing green bonds or other green debt instruments.

Such an agency may charge a fee from the issuer and ensure that the fund raised through such issuance of debts are indeed used in green projects. Such an institution may also be responsible for penalising issuers for missing their green objectives. This would promote investor confidence and help in market development.

Such an agency may be set up on the lines of the Export Credit Guarantee Corporation (ECGC) in India and/or Japan International Cooperation Agency (JICA) and Japan Bank for International Cooperation (JBIC) of Japan. The agency should be also empowered to impose penalty on defaulters for missing annual green objectives.

Involving local government bodies will be crucial to meeting India's SDGs goals by 2030. Hence it also makes sense to introduce more local level bonds focussed on local level objectives, pertinent to industries in certain geographic locations.

For example, a sustainable bond focussing on reducing air pollution in Delhi specifically for Delhi based industries will be of more value for local governance and have further ground impact. A suitable model to consider is that of Municipal Bonds issued by the Bangalore Municipal Corporation and the Municipality of Chennai which helped local government in undertaking projects related to infrastructure development in the area.

Another novel development in India has been the introduction of an Emissions Trading System (ETS). India has run a pilot of ETS, also known as carbon trading, in Surat in collaboration with the Government of Gujarat and researchers from Harvard Kennedy School, Yale, the Energy Policy Institute at the University of Chicago (EPIC), and The Abdul Latif Jameel Poverty Action Lab (J-PAL).

It was in fact the world's first emissions trading system for particulate pollution. This emissions trading program was built on the earlier innovation by the Gujarat Pollution Control Board (GPCB) that used continuous emissions monitoring

systems to track industry emissions in real time. About 350 industries around Surat had installed continuous emissions monitoring systems and would transmit real-time, high-quality emissions data.

This new scheme took advantage of this technology's modern, transparent approach to monitoring. Under the Surat's ETS, in its third phase which began on November 16, 2019, the cap on the total mass of suspended particulate matter emissions was set at 276 tons per industrial unit[10].

The cap was based on an assessment of emissions data from the government's continuous emissions monitoring system (CEMS). For the November 16 to December 31 trading period in 2019, the GPCB distributed 80 per cent (220.8 tons worth of emissions) of permits free to participant industries at the start of trading.

The pro-rata allocations were based on the boiler and heater capacity of an industrial unit. The remaining 20 per cent of emission permits were auctioned by GPCB through the National Commodities and Derivatives Exchange (NCDEx) Limited e-market.

A preliminary survey of the 158 participating plants in the scheme, by EPIC India stated that the Surat ETS is projected to reduce particulate emission by 29 per cent while lowering the cost of particle emissions, and increase average and individual industry profits, relative to status quo regulations[11].

Media report suggests that further research has found that the ETS pilot succeeded in reducing emissions by 24 percent with little cost to the industry[12].

In August 2022 the Indian parliament passed the Energy Conservation (Amendment) Bill, 2022 which proposes that the central government specify a carbon credit trading scheme, where the central government or any authorised agency may issue carbon credit certificates to entities registered under and compliant with the scheme, while such entities can trade these certificates in the secondary market[13].

This will further encourage penetration of renewables in energy mix, and effective implementation. The Bureau of Energy Efficiency (BEE) has also released a blueprint for national carbon market in India.

Much like for green bonds, policy groundwork is essential. Policymakers need to come out with regulatory guidelines for ETS along with explicit directives for all participants on the ETS ie. market makers, issuers, intermediaries, assurers etc.

India also needs to set measurement standards for taxonomy in the ETS market. There is also value in creating a baseline for measuring carbon emission reduction. Currently, there is no sector specific guidelines to specify how much of carbon reduction should each sector undertake.

Domestic companies should work towards creating a decarbonisation fund which can fund decarbonisation projects. Licenses for undertaking such a fund can be accessed through collaboration of foreign companies with domestic companies.

Policymakers should come out with innovative ways and incentives for companies to participate in the Voluntary Carbon Credit Market. Policymakers should clarify and create guidelines to address the difference between carbon offset and carbon credit.

India has made significant strides in her relentless effort to meet the 2030 SDG goals. However, the deadline is not far off. Time is of the essence and the government should make every effort in creating the necessary policy environment and enabling regulations to collectively push industry, civil society, and all policy agencies in one direction. ■

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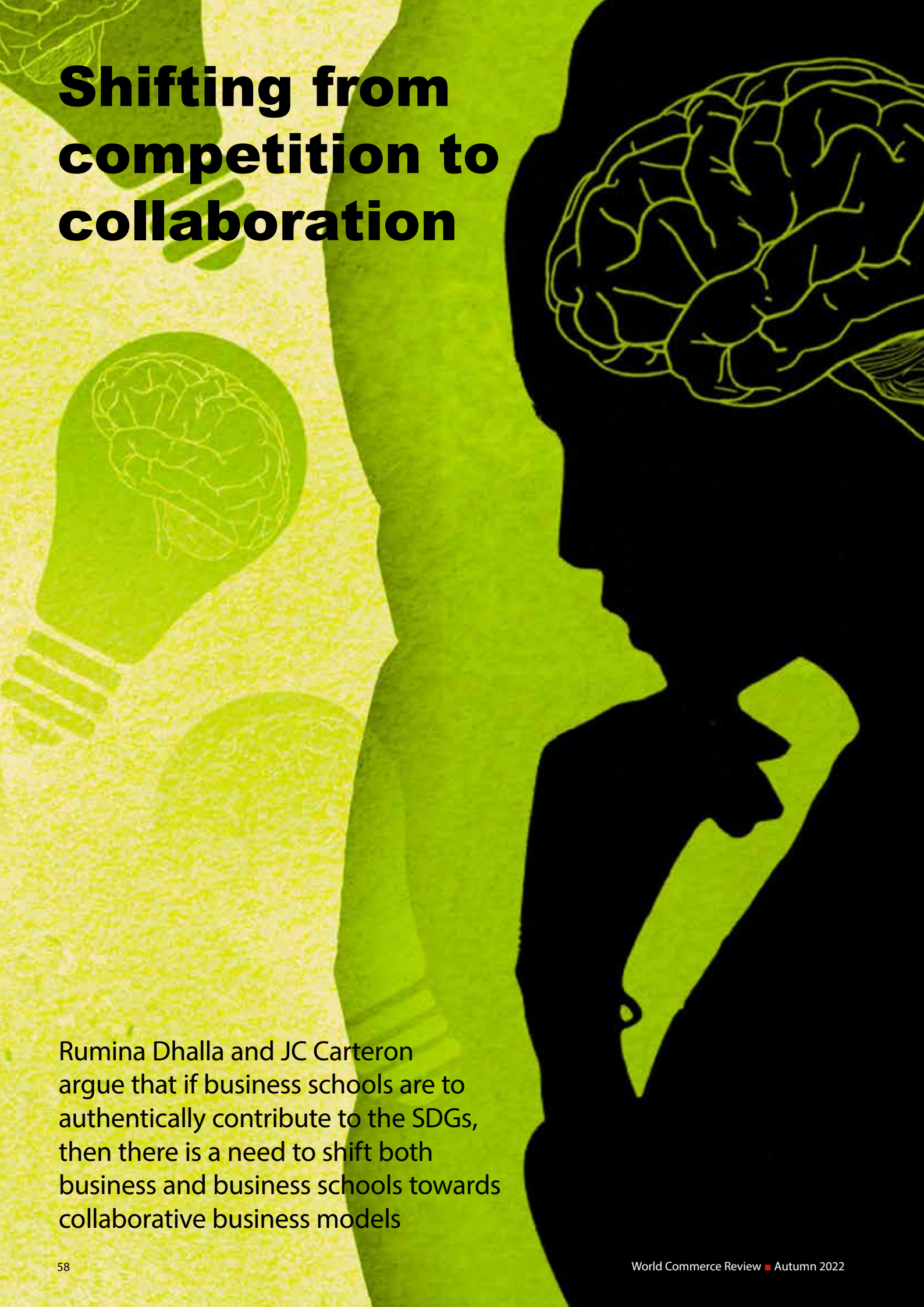
Shifting from competition to collaboration



Rumina Dhalla and JC Carteron argue that if business schools are to authentically contribute to the SDGs, then there is a need to shift both business and business schools towards collaborative business models

More and more business schools and business scholars across the globe are making an overt commitment to practice responsible leadership and integrate UN Sustainable Development Goals (SDGs) in their teaching and research. It is without a doubt that many are signalling their commitment by joining global organisations such as Globally Responsible Leadership Initiative (GRLI)[1] and Principles of Responsible Management Education (PRME)[2].

Some, however, may be failing to meet their stated commitment and by consequence are failing to meet stakeholder expectations. Lars Moratis and Frans Melissen, who have investigated this lack of success, offer some insights in a recent article in *Global Focus*[3].

They suggest that responsible management strategies at business schools are isolated, are implemented sporadically, poorly, or inauthentically or are considered a fringe topic (*"Are business schools talking the walk?"* (2022), *EFMD Global Focus*, 16(1): 8-13).

Their investigation also found that commitment and integration effort at SDG are communicated poorly. Those who do excel in communication in the promotion of their positive, anecdotal actions, are likely have to be accused of greenwashing by their stakeholders.

We acknowledge that it is likely that some business schools may be authentically achieving their stated goals and are incorrectly perceived to be greenwashing, thus further investigation is needed to highlight those who are successfully accomplishing SDG integration.

Building on prior work, we suggest that the lack of success in the integration of SDG content in business school education is likely due to the traditional business school mindset of competition (not to say the dogma) rather than collaboration which is critical for authentic responsible leadership and transformation to responsible management education.

For example, much of the popular media attention on business school is focused on rankings, signalling competition between business schools. A quick search online for the best business schools quickly brings up some well-recognised media names all purporting to rank the 'best' including *Forbes* (*The Best Business Schools List*), *Princeton Review's Best Business Schools*, and *US News Best Global Universities for Economics and Finance*.

The rankings and the jockeying for a top spot signal a culture of competitiveness among business schools. We believe that successful integration of responsible leadership mindset requires a shift from an entrenched mindset of competition to greater collaboration across business schools, across nations, and across disciplines.

It is not a question of denying that competition exists, or even that it can sometimes drive innovation, but rather of allowing spaces for collaboration. Thus, while competition can be an effective and well-known strategy to bring people together to

"Given the size, scope, and severity of the challenge and the speed with which humanity will have to radically change to avoid catastrophic failure and 'hitting the wall too violently', collaboration is required"

focus on a common issue and seek out the best solutions, cooperation between stakeholders has a number of advantages.

For example, collaborators can share expertise and resources for mutual benefit, thus reducing need for individual investments, they can benefit from diversity brought by collaborators and benefit from the individual participants' social capital and network. Collaborations can diffuse risk for potential failures and mistakes and allow collaborators to leverage on economies of scale.

Another advantage of specific cooperation between institutions of higher education, based on personal, anecdotal experience of one of the authors of this article, is that it can reduce the potential of unethical competition, as without mutual trust and respect, authentic collaboration is unlikely. For example, it is less likely one will openly compete with the same institutions that have helped yours by sharing their best practices.

Given the size, scope, and severity of the challenge and the speed with which humanity will have to radically change to avoid catastrophic failure and 'hitting the wall too violently', collaboration is required.

No institution can claim to know all the solutions, how to implement them and how to single-handedly transform the whole system. No longer can climate crisis and societal challenges be the responsibility of a 'few'.

SDG 17 specifically calls for partnerships and collaboration for sustainable development. We are beginning to see a number of universities publicly commit to cooperation. For example, higher education institutions are heeding the SDG 17 call and universities are signing pledges for cooperation for SDGs. In Canada, universities have launched a pan-Canadian initiative that highlights SDG-related involvement and collaborative projects.

Focusing on individualism for competitive and reputational reasons, while very well accepted and practised in the traditional profit-driven business models, need now to be authentically transformed to strategies that engender a collaborative, inclusive approach.

Popular media has taken business school education to task by pointing out that business schools teach traditional business practices and commitment to responsibility and ethics are inauthentic, and simply decoration.

This is particularly important if we are to be able to include previously excluded stakeholders and nations. We must be willing to reach across nations and disciplines to engage to find solutions to societal issues and address the climate crisis and sustainable development.

Where in the past business schools were able to achieve sustained competitive advantages through specialisations, branding, and achieving top spots in rankings, winning at sustainable development will require collaborative, inclusive, and responsible leadership. Anything less will be considered inauthentic and 'greenwashing'. A mindset of focusing on one's own success will create barriers required to seek innovative, inclusive solutions.

Schools may value the power and performance of certain corporations and their ability to innovate in order to outperform, or even overwhelm, their competitors, and Michael Porter's *Five Forces* framework is a familiar tool to assess competition in business and strategy.

If business schools are to authentically contribute to the SDGs, then responsible leadership dictates that there is a need to shift both business and business schools towards collaborative business models. This will likely require the dedication of meaningful resources to design and deploy their strategies at an institutional and systems level.

Collaboration is a 'bolder vision for business schools' as noted by Peter Tufano in *Harvard Business Review*[4]. Tufano argues that if business schools are going to call upon businesses to collaborate and partner with stakeholders and be inclusive, then business schools themselves must also do so, authentically, and lead by example.

Business schools must acknowledge that the time where control and competition for competitive advantage has melded into the past; the current turbulent times require collaborative and responsible leadership to solve the critical issues facing our society.

In nature, competition certainly exists, however, cooperation and mutual aid between and within species is widespread and effective. While much of business strategy focuses on the tenets of survival of the fittest, the natural environment thrives on connectedness and sharing of resources.

It may benefit the higher education institutions to be inspired by what has made life a highly resilient system. SDGs address global challenges at a systems level and successful solutions will require collaboration across systems. This has implications for individual institutional survival as well.

Business schools are seen to be lagging behind business in addressing climate change issues in their activities, thus if they are to espouse their vision and commitment to sustainability but enact anything less, they will likely always be stuck at 'greenwishing'. ■

ABOUT THE AUTHORS

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Endnotes
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Advancing to a sustainable future

Ed Bolen is President and CEO of the National Business Aviation Association (NBAA)

The global business aviation community continues to advance toward a more sustainable future. In the US, our industry recently earned a long-sought victory to promote greater use of sustainable aviation fuels (SAF) at a time when our industry is under more pressure than ever before to demonstrate its environmental credibility.

Partly derived from a diverse array of renewable sources, SAF holds the potential right now to reduce lifecycle carbon emissions from the aviation sector by as much as 80 percent, and work continues to improve on that impressive figure even more.

In August, US President Joe Biden signed the Inflation Reduction Act of 2022 into law. This new legislation included a blenders tax credit (BTC) for SAF producers, making them eligible for a $1.25 per gallon credit for each gallon of SAF sold as part of a qualified fuel mixture with a demonstrated lifecycle greenhouse gas (GHG) reduction of at least 50% compared to conventional jet fuel.

The stand-alone SAF tax credit, which goes into effect in January, increases by one cent for each percentage point by which the lifecycle GHG emissions reduction of such fuel exceeds 50 percent, up to $1.75 per gallon.

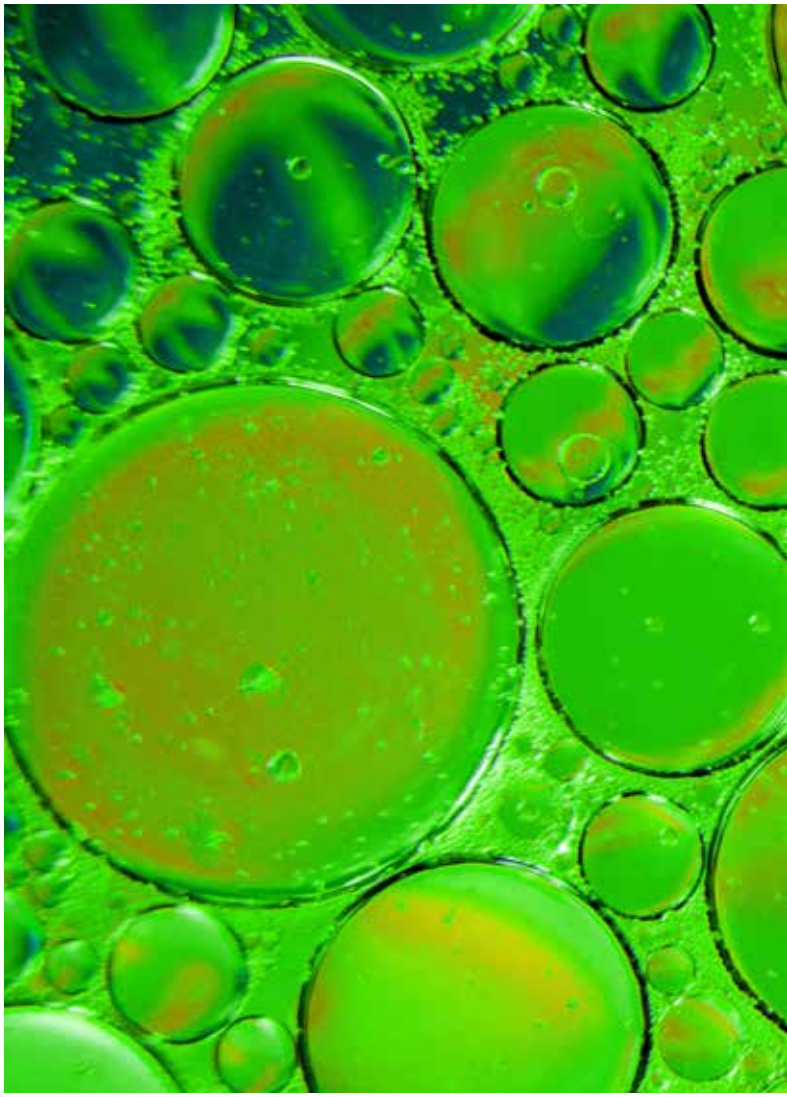
Implementation of this credit marks genuine progress toward increasing SAF production, promoting greater availability at general aviation airports and reducing costs to end users. As we've seen with similar tax credit programs for other alternative fuels like biodiesel, the BTC will markedly incentivize production of SAF, significantly expanding its availability while also helping to reduce costs for the fuel for flight operations.

This credit will run through the end of 2024. On 1 January 2025, the Clean Fuel Production Credit (CFPC) will apply to all transportation fuels, based on the level of GHG reduction performance of a fuel versus a baseline emissions factor. Under this system, SAF will be eligible for a credit of up to $1.75 per gallon for fuels with a 100% GHG reduction, with lower credits for fuels demonstrating lower levels of GHG reduction.

Efforts across the industry and around the globe

Without question, SAF offers operators a proven method to actively curb CO_2 emissions and make business aviation flying even more efficient and more sustainable.

Implementation of the SAF BTC also marks another significant step in fulfilling our industry's pledge to achieve net zero CO_2 emissions by 2050 under the Business Aviation Commitment on Climate Change. First implemented in 2009 and renewed last year, this commitment addresses numerous ways in which business aviation stakeholders can reduce their carbon footprint.

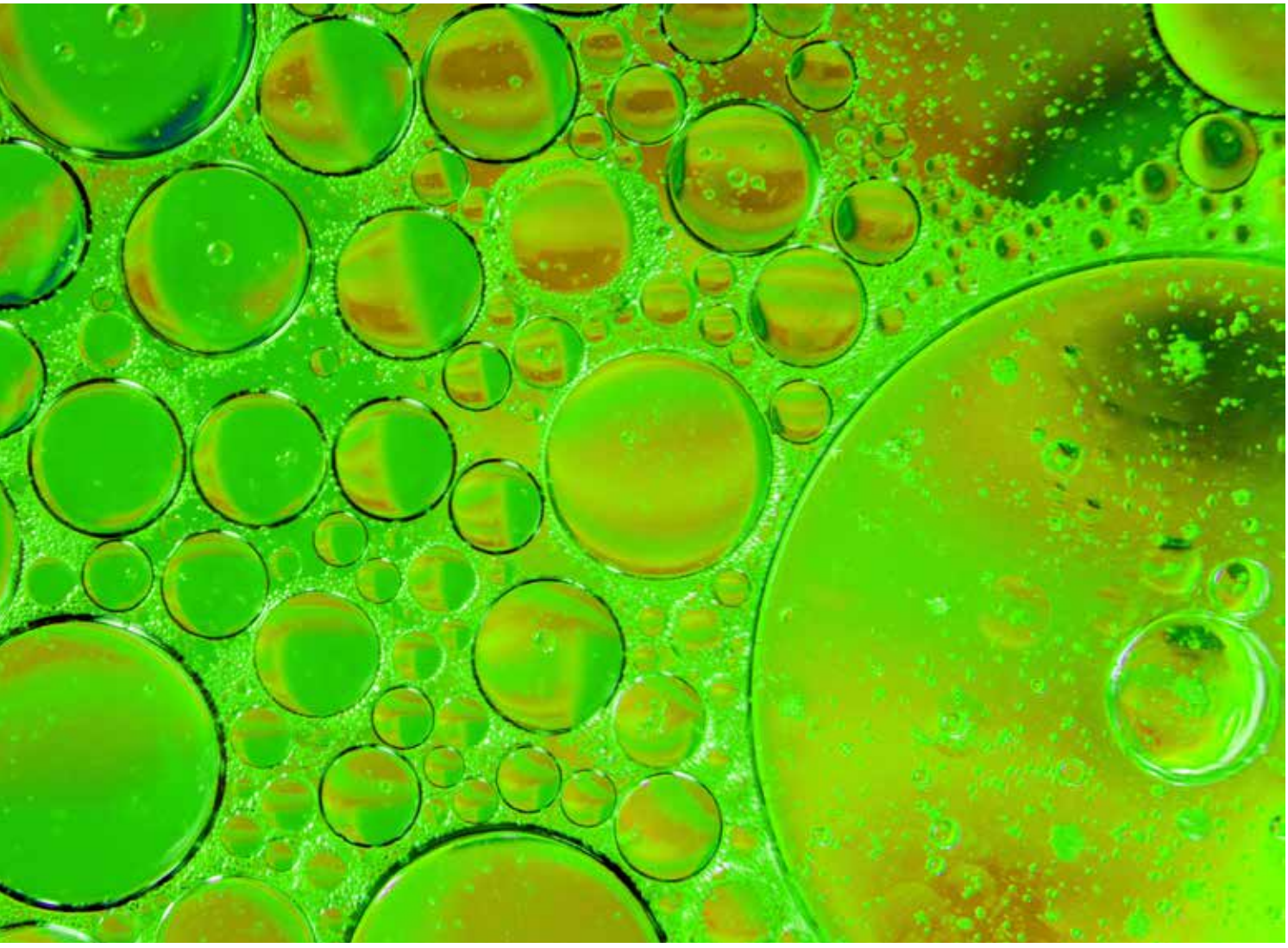


"Business aviation offers the unparalleled ability to link communities and companies around the world and connect companies and clients throughout North America, Europe and beyond"

From promoting more sustainable practices in everyday activities at business aviation flight departments to certifying new hangar construction to LEED (Leadership in Energy and Environmental Design) standards, our industry continues to make sustainability not just a buzzword, but an active priority across all facets of their operations worldwide.

These measures complement new, more efficient aircraft designs and engines being rolled out by business aviation OEMs that allow companies to go farther on less fuel. Sustainability is also one of the factors spurring development in the emerging advanced air mobility (AAM) industry.

Powered largely by all-electric or hybrid-electric propulsion systems that offer the promise of drastically reduced CO2 and noise emissions over conventional rotorcraft, AAM offers new options for short- to medium-range trips, particularly in dense urban environments that may currently lack efficient transportation options.



Two key initiatives formed last year are furthering these efforts. The NBAA Sustainable Flight Department Accreditation Program advances a sustainability culture in business aviation organizations and recognize those that meet or exceed specified criteria in flight, operations, ground support and infrastructure.

Similarly, the NBAA Sustainability Subcommittee of the NBAA Maintenance Committee is working to develop educational resources to help business aircraft operators pursue initiatives to foster greater environmental awareness industry-wide.

Sustainability in focus at NBAA-BACE

Advancing our industry's sustainability is also a key theme at NBAA's conventions and events. Last year in Las Vegas, we unveiled an all-new carbon-offset program to make the NBAA Business Aviation Convention and Exhibition (NBAA-BACE) one of the world's largest carbon-neutral events. Nearly 100 exhibitors signed a Green Pledge to limit their environmental footprint throughout the show.

These programs will again be front-and-centre throughout the 2022 edition of NBAA-BACE, taking place October 18-20 in the Orange County Convention Center in Orlando, FL.

Additionally, the Business Aviation Sustainability Summit, held in conjunction with the show, will spotlight the benefits of SAF and other methods by which business aviation flight operations may reduce their carbon footprint.

NBAA-BACE will also feature more than 30 education sessions focusing on the most important issues in business aviation today, from AAM to workforce issues to sustainability and much more.

The show will also include the latest and most advanced business aircraft available today alongside next generation hybrid- and electric-powered, vertical take-off and landing (eVTOL) AAM aircraft pointing to our industry's promising and sustainable future.

Business aviation offers the unparalleled ability to link communities and companies around the world and connect companies and clients throughout North America, Europe and beyond.

Our sustainability focus also highlights the many ways our industry continues to innovate, to inspire and to answer challenges in strong and resilient fashion.

On behalf of the more than 10,000 members of NBAA, I invite the readers of *World Commerce Review* to consider attending NBAA-BACE, where you may experience first-hand our industry's exciting, and sustainable future. ■

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Responsive…Efficient…Innovative!

The Cayman Islands Aircraft Registry (CIAR) is the registry of choice for many owners, financiers, management companies, attorneys and other key decision makers.

Stringent standards and a mandate for absolute safety guide our oversight of Cayman registered aircraft. The CIAR has been operating as a reputable offshore aircraft registry since the early 1970s and has an outstanding safety record.

As custodian of the CIAR, the Civil Aviation Authority of the Cayman Islands' (CAACI) dedicated technical teamwork with aircraft operators on annual plans to ensure regulatory safety standards and timelines are met and where appropriate, flexibility and customised solutions afforded.

The CAACI works closely with Cayman Islands' industry experts in the legal/financial and company registration sectors to ensure sound and secure transactions for the initial aircraft registration or changes thereafter.

The CAACI staff is highly qualified and experienced in regulatory safety oversight and in working with aircraft management and maintenance organisations to ensure compliance with internationally mandated standards.

The CAACI regulates in accordance with the Air Navigation (Overseas Territories) Order, 2013 (AN(OT)O), as amended, a statutory instrument predicated on UK legislation that contains regulations governing the operational and airworthiness requirements for Cayman registered aircraft. Also relative is the guidance contained in the Overseas Territories Aviation Requirements (OTARS,) as published for all UK Overseas Territories.

The criteria for registering an aircraft begins with the first phase of the submission of registration documents through VP-C Online, the CAACI's bespoke secured data management portal. All of the registering owner's due diligence documents are required to be submitted when the Registration Application is submitted.

Appropriate due diligence is conducted in compliance with the Anti-Money Laundering Regulations of the Cayman Islands. With stricter Anti-Money Laundering regulations coming into effect in the Cayman Islands and the world over, the CIAR is required to be knowledgeable and comfortable with qualifying registrants that are accepted to the registry.

During the initial application process, the applicant can choose from a list of available registration marks which start

with VP-C plus two variable letters. All information pertaining to registration of aircraft on the CIAR can be obtained from the CAACI website at https://www.caacayman.com/aircraft-registry/

The Cayman Islands provides a credible, politically stable jurisdiction of choice for aircraft registrations. As a leading tax neutral international financial centre, the English legal system provides owners and financiers of aircraft certainty and confidence.

Traditionally a private/corporate Aircraft Registry, the CAACI in conjunction with the CI Government and the Cayman Islands' Special Economic Zone – Cayman Enterprise City (CEC) has introduced an alternative means for compliance with the 'Principal Place of Business' criterion to allow offshore Air Operator's Certificates (AOC) to be granted for certain commercial operations.

The CIAR also works in close partnerships to ensure that aircraft registrants have expert guidance on applicable law and procedures. One such example is participation in a CI Government working group in partnership with local aviation finance attorneys to enable legislation compliant with The Convention on International Interests in Mobile Equipment (Cape Town Convention). The International Interests in Mobile Equipment (Cape Town Convention) Law (Cayman Islands), 2015, was enacted and came into effect on 1 November 2015.

Accordingly, the Cayman Islands received international recognition under the Cape Town Convention. This provided further comfort to global financial institutions that participate in aircraft finance transactions who wish to transact with parties in jurisdictions that are recognised under the Cape Town Convention.

An example of exceptional service provided by the CIAR is the creation of VP-C Online, a bespoke electronic data management system that provides a secure way to manage all aircraft documents including applications (starting with the registration application), certificates and approvals. VP-C Online is a convenient and secured way for registrants to apply for authorisations and certificates that are required for both initial aircraft registration and for continuing airworthiness and operations.

The ability for clients to file applications 24/7 from any time zone around the world is yet another positive client service benefit associated with the CIAR. The secured portal also acts as a repository for all technical and supporting documentation for the registration and continuing airworthiness processes for the tenure of the aircraft on the Registry.

Registrants will also enjoy the ability to check the status of applications and to re-print certificates or authorisations should the need arise. Testimonials received indicate that this convenient system makes The Registry a preferred choice in registration of aircraft.

The CIAR has always recognised the importance of aircraft financiers and lessors, as many of our clients in aircraft ownership and operation depend on these financial

"Stringent standards and a mandate for absolute safety guide our oversight of Cayman registered aircraft"

intermediaries. This is a valuable relationship we wish to foster through an insightful and collaborative understanding to the interdependencies of the industry.

We have introduced material processes, bespoke products and refined online portals, all specifically designed to support the interests of lessors. The CIAR is working to establish long term relationships with lessors to provide ready solutions where aircraft registration support is required with emphasis beyond the registration process.

The CIAR is currently focused on offering a 'Transition Register' that is supported by highly experienced employees and full-time personnel of the CAACI.

Our team have extensive regulatory backgrounds and experience in several regulatory jurisdictions; this along with our regulatory Code (Overseas Territories Aviation Requirements [OTARs]) enables our ability to place aircraft in multiple jurisdictions in an expeditious manner following our normal attention to stringent safety protocols.

A new objective of the CAACI, within the Transition Register offering, is to delegate responsibilities to qualified Continuing Airworthiness Management Organisations (CAMO) under the Air Navigation (Overseas Territories) Order (AN(OT) O). This is a significant task for the CAACI where specific oversight arrangements in keeping within the delegation have to be established to ICAO performance-based regulation standards.

This delegation to selected CAMOs (approved for Aircraft Transition activities) provides for significant efficiencies in the relationship between the CAACI acting in regulatory oversight and the CAMO making submissions for gaining Approvals and Certificates.

Scenarios such as aircraft repossessions where timely and proactive solutions are necessary, these pre-established compliant resources in CAMO and Ferry Flight Operators are vital to achieving reliable and safe outcomes.

The CAACI has established a project management system for Transition Aircraft. This generates the need for close coordination between all involved, regular liaison meetings are arranged to ensure the Transition project remains active during the aircraft's registry in the Cayman Islands and commensurate with the status of the Lessors operational objective. The key is to mitigate last minute exercises often the case where aircraft sit in storage without any oversight.

Our online portal VP-C online is being innovated to include a Lessor Module whereby a lessor can apply for a VP-C Online account for visibility to the aircraft that a lessor may manage.

The CAACI offers Lessors a Service Level Agreement (SLA) that is specifically designed for Aircraft Transitions, offering a clear list of the services provided and a fixed fee structure. This provides the Lessor with confidences and pre-defined budgetary information often required by financiers and investors associated with aircraft assets.

With a focus on the quality of service and flexibility the CIAR continues to set themselves apart from other jurisdictions offering aircraft registration. The CIAR remains committed to offering a personal, responsive and high-quality service to clients and partners and to finding innovative and efficient solutions to the needs of those they serve.

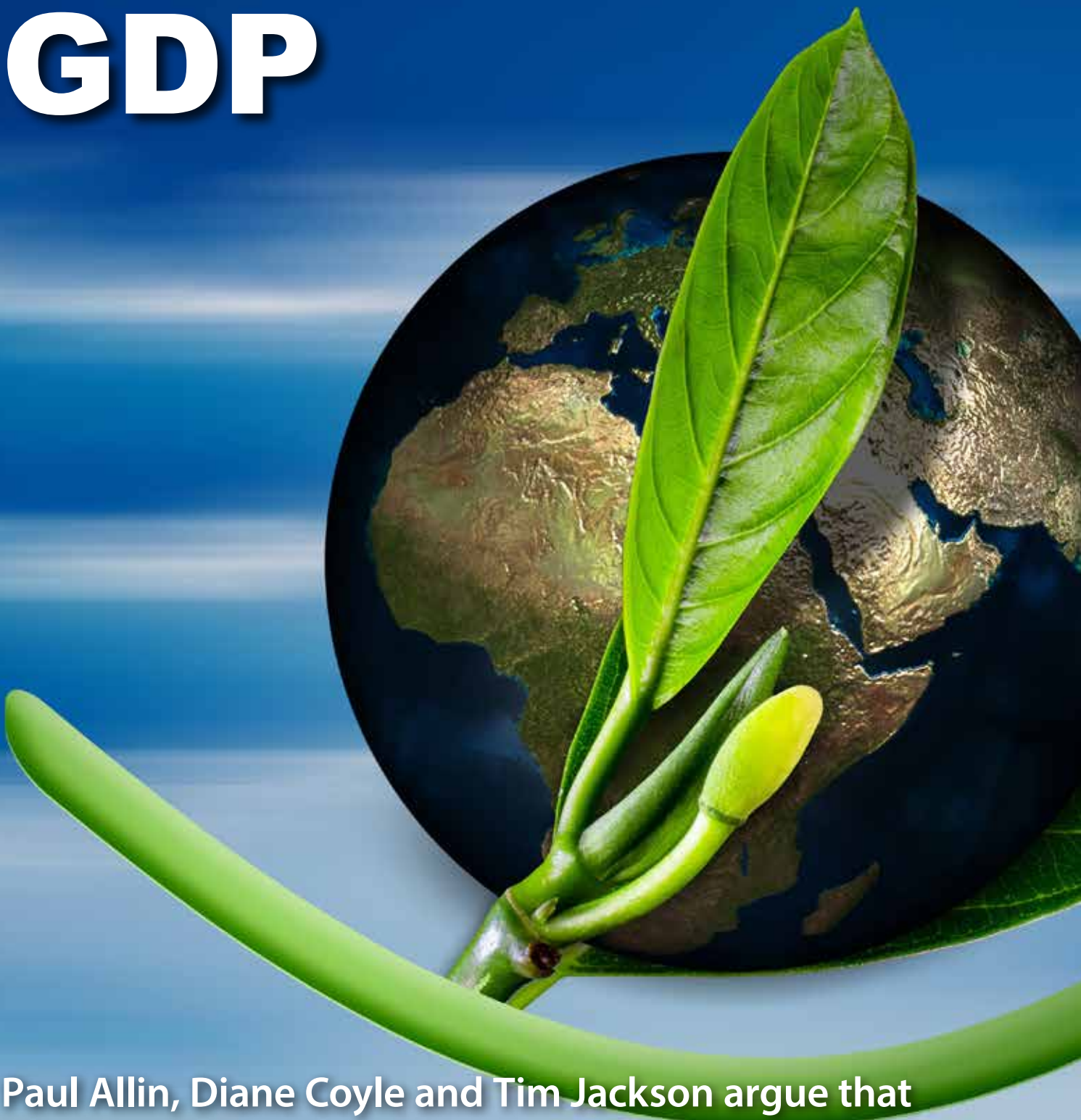
The Cayman Islands Aircraft Registry: Responsive…Efficient…Innovative! Offering total aircraft registration solutions. ■

World Commerce Review is pleased to announce that BVI Finance has been awarded the Best Provider International Financial Services 2022.

The World Commerce Review awards celebrate achievement, innovation and excellence across several fields of endeavour. Our award programs are tailored to provide a comprehensive analysis of the very best in each market.

The WCR awards are recognised as the principal indications of professional conduct and excellence. The selection panel took into account product innovation, on-going customer support and best practice criteria as well as a continuing commitment to deploying the best possible solutions for the benefit of their clients.

Beyond GDP



Paul Allin, Diane Coyle and Tim Jackson argue that changing how we measure progress is key to tackling a world in crisis

It's an odd quirk of history that, on the first day of his ill-fated presidential campaign in March 1968, Robert F Kennedy chose to talk to his audience about the limitations of gross domestic product[1] (GDP) – the world's headline indicator of economic progress.

It seems stranger still that, despite the power of that iconic speech, growth in GDP[2] remains to this day the predominant measure of progress across the world. Economic success is measured by it. Government policy is assessed by it. Political survival hangs on it.

Kennedy's speech inspired a host of critiques. It has been quoted by presidents, prime ministers and Nobel laureates. Yet GDP itself has survived until now[3], more-or-less unscathed.

But amid ever-louder concerns about the failure of national economies to tackle the multiple threats posed by climate change, spiralling energy costs, insecure employment and widening levels of inequality, the need to define and measure progress in a different way now looks as unarguable as it is urgent.

The goods, the bads, and the missing

In simple terms, GDP is a measure of the size of a country's economy: how much is produced, how much is earned, and how much is spent on goods and services across the nation.

The monetary total, whether in dollars or euros, yuan or yen, is then adjusted for any general increase in prices to give a measure of 'real' economic growth over time. When governments adopt policies to pursue economic growth, this is how those policies are evaluated.

Since 1953, GDP has been the headline measure in a complex system of national accounts[4] overseen by the United Nations. Developed during the second world war, these accounts were motivated in part by the need to determine how much governments could afford to spend on the war effort.

But in measuring the monetary value of economic activity, GDP can incorporate many of the 'bads' that detract from our quality of life. War, pollution, crime, prostitution[5], traffic congestion, disasters like wildfires and the destruction of nature – all can have a positive impact on GDP. Yet they cannot really be construed as components of economic success.

At the same time, there are numerous aspects of our lives that simply go missing from this conventional account. The inequality in our societies. The contributions from unpaid work.

The labour of those who care for the young and the elderly at home or in the community. The depletion of natural resources or biodiversity. And the value of data and many digital services.

What lies outside the market, including public services funded out of taxation, remains unmeasured in a metric of monetary exchange. Kennedy was blunt: *"[GDP] measures everything, in short, except that which makes life worthwhile."*

"But in their search for a reliable guide towards social wellbeing, governments, businesses, statisticians, climate scientists and all other interested parties must work with civil society, the media and the public to establish a more effective framework for measuring progress"

It's a sentiment that has resonance half a century later. In a striking encounter during the Brexit debate, a UK academic was trying to convey to a public meeting the dangers of leaving the EU. The impact on GDP would dwarf any savings from the UK's contributions to the EU budget, he told the audience. *"That's your bloody GDP!"* shouted[6] a woman in the crowd. *"It's not ours."*

This sense of an indicator out of touch with reality may be one of the reasons there is momentum for reform. When GDP conceals crucial differences between the richest and the poorest in society, it inevitably says little about the prospects for ordinary people.

But there are other reasons too for an emerging change of heart. The pursuit of GDP growth as a policy goal, and the impact that has on government, business and personal decision-making, has accompanied increasing devastation of the natural world, a loss of forests and habitats, the destabilisation of the climate, and near-meltdowns of the world's financial markets. At the same time, GDP has become a poor measure of the technological transformation of society.

Its tenacity as a measure of progress, despite these well-known limitations, arises from factors which are on the one hand technocratic, and on the other sociological.

As the headline measure in a sophisticated system of national accounts, GDP has a technocratic convenience and analytical elegance that remains unsurpassed by many alternative measures. Its authority arises from its ability to be simultaneously a measure of production output, consumption expenditure and income in the economy.

Despite this complex framework, it also offers the deceptive simplicity of a single headline figure which appears to be directly comparable from year to year and across nations, based on the simple (if inadequate) idea that more economic activity necessarily leads to a better life.

However, the combined technical authority and political usefulness of this idea has led to "path dependence" and forms of social lock-in that are difficult to address without significant effort. Think of switching to an alternative as being like switching from driving on the left to the right-hand side of the road.

Yet what we measure matters. And while we're busy looking in the wrong direction, as Kennedy pointed out, bad things can happen. Kennedy's campaign – and his critique of GDP – was cut cruelly short on June 5 1968, when he was fatally wounded by an assassin's bullet. More than half a century later, his call for reform of how we assess progress (or its absence) has never been stronger.

Robert F Kennedy on the campaign trail, 1968

The trouble with GDP: historical flaws

The way societies have understood and measured progress has changed considerably over the centuries. Measurement of 'the economy' as a whole is a relatively modern, 20th-century concept, beginning with efforts by statisticians and economists such as Colin Clark and Simon Kuznets in the 1920s and 1930s to understand the impact of financial crisis and depression.

Kuznets, now best known for his curve[7] describing the relationship between GDP and income inequality, was particularly concerned to develop a measure of economic welfare rather than just activity. For example, he argued for omitting expenditures that were unwelcome necessities rather than services or goods consumers actively wanted – such as defence spending.

However, the second world war overtook and absorbed these earlier notions of a single measure of economic welfare, resulting in what first became modern gross national product (GNP)[8], and then GDP.

The imperative – set out on the Allied side by John Maynard Keynes in his 1940 pamphlet *How to Pay for the War*[9] – was measuring productive capacity, and the reduction in consumption required to have enough resources to support the military effort. Economic welfare was a peacetime concern.

Post-war, unsurprisingly, American and British economists such as Milton Gilbert, James Meade and Richard Stone took the lead in codifying these statistical definitions through the UN – and its process for agreeing and formalising definitions in the system of national accounts (SNA) is still in place today.

However, since at least the 1940s, some important inadequacies of both the SNA and GDP have been widely known and debated.

Indeed, as long ago as 1934, Margaret Reid published her book *Economics of Household Production*[10], which pointed out the need to include unpaid work in the home when thinking about economically useful activity.

The question of whether and how to measure the household and informal sectors was debated during the 1950s – particularly as this makes up a larger share of activity in low-income countries – but was omitted until some countries, including the UK, started to create household satellite accounts[11] around 2000.

Omitting unpaid work meant, for instance, that the UK's increased productivity growth between the 1960s and 1980s was then overstated, because it in part reflected the inclusion of many more women in paid work[12] whose contributions had previously been invisible to the national GDP metric.

Another longstanding and widely understood failure of GDP is not including environmental externalities and the depletion of natural capital. The metric takes incomplete account of many activities that do not have market prices, and ignores the additional social costs of pollution, greenhouse gas emissions and similar outputs associated with economic activities.

What's more, the depletion or loss of assets such as natural resources (or indeed buildings and infrastructure lost in disasters) boosts GDP in the short term because these resources are used in economic activities, or because there is a surge in construction after a disaster.

Yet the long-term opportunity costs are never counted. This massive shortcoming was widely discussed at the time of landmark publications such as the 1972 *Limits to Growth* report[13] from the Club of Rome, and the 1987 *Brundtland Report*[14] from the World Commission on Environment and Development.

As with household and informal activity, there has been recent progress in accounting for nature, with the development of the System of Environmental Economic Accounting (SEEA)[15] and publication of regular (but separate) statistics on natural capital in a number of countries. The UK has again[16] been a pioneer in this area, while the US recently announced[17] it would start following this approach too.

New challenges to the value of GDP

Other, perhaps less obvious failings of GDP have become more prominent recently. Digitisation of the economy has transformed the way many people spend their days in work and leisure, and the way many businesses operate, yet these transformations are not apparent in official statistics.

Measuring innovation has always been tricky, because new goods or improved quality need to be incorporated into observable prices and quantities – and what is the metric for a unit of software or management consultancy?

But it is harder now because many digital services are 'free' at point of use, or have the features of public goods in that many people can use them at the same time, or are intangible.

For example, data is without doubt improving the productivity of companies that know how to use it to improve their services and produce goods more effectively – but how should a dataset's value, or potential value, to society (as opposed to a big tech company) be estimated?

Recent work[18] looking at the price of telecommunications services in the UK has estimated that output growth in this sector since 2010 has ranged anywhere from about 0% to 90%[19], depending on how the price index used to convert market prices to real (inflation-adjusted) prices takes account of the economic value of our rapidly growing use of data.

Similarly, it is not obvious how to incorporate advertising-funded 'free' search, crypto currencies and NFTs[20] in the measurement framework.

A key limitation of GDP, particularly in terms of its use as an indicator of social progress, is that it offers no systematic account of the distribution of incomes. It is entirely possible

Presentation in Paris of the Stiglitz report, 2009

for average or aggregate GDP to be rising, even as a significant proportion of the population find themselves worse off.

Ordinary incomes have stagnated or fallen in recent decades even as the richest in society have become wealthier. In the US, for example, Thomas Piketty and his colleagues[21] have shown that in the period between 1980 and 2016, the top 0.001% of society saw their incomes grow by an average of 6% per year. Income for the poorest 5% of society fell in real terms.

Given these many issues, it might seem surprising that the debate about 'Beyond GDP'[22] is only now – possibly – turning into actions to change the official statistical framework. But paradoxically, one hurdle has been the proliferation of alternative progress metrics.

Whether these are single indices that combine a number of different indicators or dashboards showcasing a wide range of metrics, they have been ad hoc and too varied to build consensus around a new global way of measuring progress.

Few of them provide an economic framework for consideration of trade-offs between the separate indicators, or guidance as to how to interpret indicators moving in different directions. There is a breadth of information but as a call to action, this cannot compete against the clarity of a single GDP statistic.

Statistical measurement is like a technical standard such as voltage in electricity networks or the Highway Code's rules of the road: a shared standard or definition is essential.

While an overwhelming majority might agree on the need to go beyond GDP, there also needs to be enough agreement about what 'beyond' actually involves before meaningful progress on how we measure progress can be made.

Change behaviour, not just what we measure

There are many visions to supplant GDP growth[23] as the dominant definition of progress and better lives. In the wake of the COVID pandemic, it has been reported that most people want a fairer, more sustainable future[24].

Politicians can make it sound straightforward. Writing in 2009, the then-French president Nicolas Sarkozy explained he had convened a commission – led by internationally acclaimed economists Amartya Sen, Joseph Stiglitz and Jean-Paul Fitoussi – on the measurement of economic performance and social progress on the basis of a firm belief: that we will not change our behaviour *"unless we change the ways we measure our economic performance."*

Sarkozy also committed to encouraging other countries and international organisations to follow the example of France in implementing his commission's recommendations[25] for a suite of measures beyond GDP.

The ambition was no less than the construction of a new global economic, social and environmental order.

In 2010, the recently-elected UK prime minister, David Cameron, launched a programme to implement the Sarkozy commission's recommendations in the UK.

He described this as starting to measure progress as a country *"not just by how our economy is growing, but by how our lives are improving – not just by our standard of living, but by our quality of life."*

Once again, the emphasis was on measurement (how far have we got?) rather than behaviour change (what should people do differently?).

The implication is that changing what we measure necessarily leads to different behaviours – but the relationship is not that simple. Measures and measurers exist in political and social spheres, not as absolute facts and neutral agents to be accepted by all.

This should not dissuade statisticians from developing new measures, but it should prompt them to engage with all who might be affected – not just those in public policy, commerce or industry. The point after all is to change behaviour, not just to change the measures.

Economists are increasingly adopting complex systems thinking, including both social and psychological understandings of human behaviour. For example, Jonathan Michie[26] has pointed to ethical and cultural values, as well as public policy and the market economy, as the big influences on behaviour.

Katharina Lima di Miranda and Dennis Snower[27] have highlighted social solidarity, individual agency and concern for the environment alongside the 'traditional' economic incentives captured by GDP.

GDP alternatives in practice

Since Kennedy's 1968 critique, there have been numerous initiatives to replace, augment or complement GDP over the years. Many dozens of indicators have been devised and implemented at local, national and international scales.

Some aim to account more directly for subjective wellbeing, for example by measuring self-reported life satisfaction or 'happiness'.

Some hope to reflect more accurately the state of our natural or social assets by developing adjusted monetary and non-monetary measures of 'inclusive wealth'[28] (including a team at the University of Cambridge led by this article's co-author Diane Coyle).

The UK government has accepted this as a meaningful approach to measurement in several recent policy documents, including its Levelling Up white paper[29].

There are two fundamental arguments for a wealth-based approach:

- It embeds consideration for sustainability in the valuing of all assets: their value today depends on the entire future flow of services they make available. This is exactly why stockmarket prices can fall or rise suddenly, when expectations about the future change.

  Similarly, the prices at which assets such as natural resources or the climate are valued are not just market prices; the true 'accounting prices' include social costs and externalities.

- It also introduces several dimensions of progress, and flags up the correlations between them. Inclusive wealth includes produced, natural and human capital, and also intangible and social or organisational capital.

  Using a comprehensive wealth balance sheet to inform decisions could contribute to making better use of resources – for example, by considering the close links between sustaining natural assets and the social and human capital context of people living in areas where those assets are under threat.

Other initiatives aim to capture the multi-dimensional nature of social progress by compiling a dashboard of indicators – often measured in non-monetary terms – each of which attempts to track some aspect of what matters to society.

New Zealand's Living Standards Framework[30] is the best-known example of this dashboard approach. Dating back to a 1988 Royal Commission on Social Policy and developed over more than a decade within the New Zealand Treasury, this framework was precipitated by the need to do something about the discrepancy between what GDP can reflect and the ultimate aim of the Treasury: to make life better for people in New Zealand.

The NZ Treasury now uses it to allocate fiscal budgets in a manner consistent with the identified needs of the country in relation to social and environmental progress.

The relevance to combating climate change is particularly clear: if government spending and investment are focused on narrow measures of economic output, there is every possibility that the deep decarbonisation needed to achieve a just transition to a net zero carbon economy[31] will be impossible.

Equally, by identifying areas of society with declining wellbeing, such as children's mental health, it becomes possible to allocate Treasury resources directly to alleviate the problem.

The UK's Measuring National Wellbeing (MNW)[32] programme, directed by Paul Allin (a co-author of this article), was launched in November 2010 as part of a government-led drive to place greater emphasis on wellbeing in national life and business.

Much of the emphasis was on the subjective personal wellbeing measures[33] that the UK's Office for National Statistics (ONS) continues to collect and publish, and which appear to be increasingly taken up as policy goals (driven in part by the What Works Centre for Wellbeing[34]).

The MNW team was also charged with addressing the full 'beyond GDP' agenda, and undertook a large consultation

and engagement exercise to find out what matters to people in the UK.

This provided the basis for a set of indicators[35] covering ten broad areas which are updated by the ONS from time to time. While these indicators continue to be published[36], there is no evidence that they are being used to supplement GDP as the UK's measure of progress.

Accounting for inequality within a single aggregate index is obviously tricky. But several solutions to this problem exist. One of them, advocated by the Sen-Stiglitz-Fitoussi commission, is to report median rather than mean (or average) values when calculating GDP per head.

Another fascinating possibility is to adjust the aggregate measure using a welfare-based index of inequality, such as the one devised by the late Tony Atkinson.

An exercise using the Atkinson index[37] carried out by Tim Jackson, also a co-author of this article, calculated that the welfare loss associated with inequality[38] in the UK in 2016 amounted to almost £240 billion – around twice the annual budget of the NHS at that time.

Among the most ambitious attempts to create a single alternative to GDP is a measure which has become known as the Genuine Progress Indicator (GPI)[39].

Proposed initially by economist Herman Daly and theologian John Cobb, GPI attempts to adjust GDP for a range of factors – environmental, social and financial – which are not sufficiently well reflected in GDP itself.

GPI has been used as a progress indicator in the US state of Maryland since 2015. Indeed, a bill introduced to US Congress in July 2021[40] would, if enacted, require the Department of Commerce to publish a US GPI, and to *"use both the indicator and GDP for budgetary reporting and economic forecasting."*

GPI is also used in Atlantic Canada[41], where the process of building and publishing the index forms part of this community's approach to its development.

A potential gamechanger?

In 2021, the UN secretary-general António Guterres concluded his *Our Common Agenda* report[42] with a call for action. *"We must urgently find measures of progress that complement GDP, as we were tasked to do by 2030 in target 17.19 of the Sustainable Development Goals[43]."* He repeated this demand in his priorities for 2022[44] speech to the UN General Assembly.

Guterres called for a process *"to bring together member states, international financial institutions and statistical, science and policy experts to identify a complement or complements to GDP that will measure inclusive and sustainable growth and prosperity, building on the work of the Statistical Commission."*

The first manual explaining the UN's system of national accounts was published in 1953. It has since been through five revisions (the last in 2008) designed to catch up with developments in the economy and financial markets, as well as to meet user needs across the world for a wider spread of information.

The next SNA revision[45] is currently in development, led by the UN Statistics Division and mainly involving national statistical offices, other statistical experts[46] and institutional stakeholders such as the IMF, World Bank and Eurostat.

But unlike the UN's COP processes relating to climate change and, to a lesser extent, biodiversity, there has, to date, been little wider engagement with interested parties – from business leaders and political parties to civil society, non-governmental organisations and the general public.

As the British science writer Ehsan Masood[47] has observed, this revision process is happening below the radar of most people who are not currently users of national accounts.

And this means many very useful ideas that could be being fed in are going unheard by those who will ultimately make decisions about how nations measure their progress in the future.

The essence of sustainable development was captured in the 1987 *Brundtland Report*[48]: *"To contribute to the welfare and wellbeing of the current generation, without compromising the potential of future generations for a better quality of life."*

Yet it remains unclear how the next SNA revision will provide such an intergenerational lens, despite a new focus on 'missing' capitals including natural capital.

Similarly, while the revision programme is addressing globalisation issues, these are only about global production and trade – not, for example, the impacts of national economies on the environment and wellbeing of other countries and populations.

Ambitious deadlines have been set further into the future: achieving the UN's Sustainable Development Goals by 2030, and reducing global net emissions of greenhouse gases to zero before 2050.

The SNA revision process – which will see a new system of national accounts agreed in 2023 and enacted from 2025 – is a key step in achieving these longer-term goals. That is why opening up this revision process to wider debate and scrutiny is so important.

It's time to abandon this 'GDP fetish'

One lesson to learn from the history of indicators, such as those about poverty and social exclusion, is that their impact and effectiveness depends not only on their technical robustness and their fitness for purpose, but also on the political and social context – what are the needs of the time, and the prevailing climate of ideas?

The current SNA revision should be a process as much about the use and usefulness of new measures as about their methodological rigour.

Indeed, we might go as far as Gus O'Donnell[49], the former UK cabinet secretary, who said in 2020: *"Of course measurement is hard. But roughly measuring the right concepts is a better way to make policy choices than using more precise measures of the wrong concepts."*

In short, there is an inherent tension involved in constructing an alternative to GDP – namely achieving a balance between technical robustness and social resonance.

The complexity of a dashboard of indicators such as New Zealand's Living Standards Framework is both an advantage in terms of meaningfulness, and a disadvantage in terms of communicability.

In contrast, the simplicity of a single measure of progress such as the Genuine Progress Indicator – or, indeed, GDP – is both an advantage in terms of communication, and a disadvantage in terms of its inability to provide a more nuanced picture of progress.

Ultimately, a plurality of indicators is probably essential in navigating a pathway towards a sustainable prosperity that takes full account of individual and societal wellbeing. Having a wider range of measures should allow for more diverse narratives of progress.

Some momentum in the current SNA revisions process and ongoing statistical research is directed toward measurement of inclusive wealth – building on the economics of sustainability brought together in Partha Dasgupta's recent review of the economics of biodiversity[50].

This framework can probably gain a broad consensus among economists and statisticians, and is already being implemented by the UN, starting with natural capital and environmental accounting.

Including wellbeing measures in the mix would signal that wellbeing matters, at least to some of us, while also recognising that many different things can affect wellbeing. The evidence to date is that planting wellbeing measures in a different part of the data ecosystem means they will be overlooked or ignored.

Wellbeing measures are not a panacea, but without them we will continue to do things that restrict rather than enhance wellbeing and fail to recognise the potential economic, social and environmental benefits that a wellbeing focus should bring.

The task of updating the statistical framework to measure economic progress better is non-trivial. The development of the SNA and its spread to many countries took years or even decades.

New data collection methodologies should be able to speed things up now – but the first step in getting political buy-in to a better framework for the measurement of progress is an agreement about what to move to.

National accounting needs what the name suggests: an internally consistent, exhaustive and mutually exclusive set of definitions and classifications. A new framework will require collecting different source data, and therefore changing the processes embedded in national statistical offices.

It will need to incorporate recent changes in the economy due to digitalisation, as well as the long-standing issues such as inadequate measurement of environmental change.

Ultimately, this 'beyond GDP' process needs to grapple not only with measurement problems but also with the various uses and abuses to which GDP has been put. Kennedy's neat summary that it measures *"everything except that which makes life worthwhile"* points as much to the misuse of GDP as to its statistical limitations.

Its elegance in being simultaneously a measure of income, spending and output means that in some form, it is likely to remain a valid tool for macroeconomic analysis. But its use as an unequivocal arbiter of social progress was never appropriate, and probably never will be.

Clearly, the desire to know if society is moving in the right direction remains a legitimate and important goal – perhaps more so now than ever.

But in their search for a reliable guide towards social wellbeing, governments, businesses, statisticians, climate scientists and all other interested parties must abandon once and for all what the Nobel Laureate Stiglitz called a 'GDP fetish', and work with civil society, the media and the public to establish a more effective framework for measuring progress. ■

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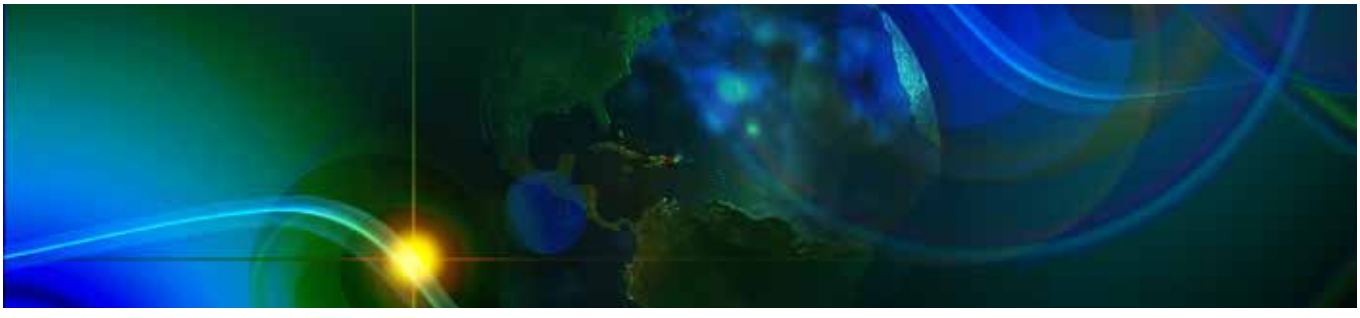

Endnotes

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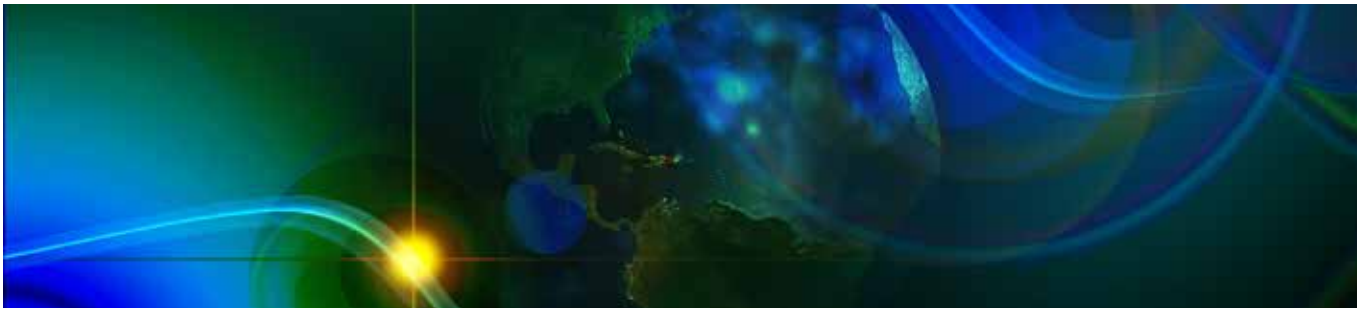


TISE's strategy for sustainable growth

In this Q&A, Cees Vermaas, CEO of The International Stock Exchange (TISE), explores the impact of macro-economic conditions on latest listing trends and the execution of a strategy to deliver a business model for sustaining future growth.

Cees, can you tell us a little about yourself and your role as CEO of The International Stock Exchange (TISE)?

Yes, it would be my pleasure. Originally, I am from The Netherlands and I have an information technology background but now I have been working within international financial market infrastructure for more than 20 years.

I have held senior executive positions within several international exchanges, including CEO of CME Europe Ltd, CEO of Euronext Amsterdam and Head of European Cash Markets for NYSE Euronext.

Since November 2020, I have been CEO of TISE with responsibility for all aspects of leadership and management of the Exchange. Focusing on strategy, business development and infrastructure, I am working with, and creating enhanced value for, all our stakeholders, including our staff, members, issuers and shareholders.

Our aim is to do this by executing a strategy which delivers a more diversified and scalable business model to sustain future growth.

And can you give us an overview of TISE?

Built on a culture of responsiveness and innovation, TISE is one of Europe's leading stock exchanges for listing bond issuances aimed at professional investors.

Headquartered in Guernsey and with staff operating across Dublin, Guernsey, the Isle of Man, Jersey and London, our regulated market is uniquely positioned within the European time zone but outside both the UK and the EU.

As a major professional bond market, we are among the leading venues in Europe for listing high yield bonds and private equity debt securities, and we are experiencing solid growth in structured finance and securitisation transactions.

We also have a pool of 'domestic' equities and a significant share of the market for listed UK Real Estate Investment Trusts (REITs), as well as a comprehensive sustainable market segment, TISE Sustainable.

We are living in a very unstable period politically, economically and socially – how has this impacted business so far this year?

The first half of 2022 comprised two very different quarters in terms of new listing volumes on TISE. Following a record 2021 and a record first quarter this year, new listings have since been subdued primarily due to a significant shift in macro-economic conditions.

There has been the much-anticipated pullback from the historic bull market run as geopolitical instability, global supply chain issues, persistent inflation and rising interest rates have combined to provide unfavourable conditions within the debt capital markets.

I would be lying if I said that we have been immune from the effects of the more unfavourable conditions, but the refinement of our core bond market proposition has successfully mitigated against the worst of the downturn and facilitated further growth in the size of our market.

So far, we have gone through the fixed income market downturn much better than most of our competitors.

Ultimately, there were 487 securities listed on TISE during the first half of the year, contributing to a 11.2% rise year on year in the total number of securities on TISE's Official List, which reached 3,815 on 30 June 2022, representing a total market value of more than £600 billion.

You mentioned that TISE is a major professional bond market so what have been some of the trends and developments in that sector?

It was just over a year ago that we enhanced our international bond listing offering through the introduction of our Qualified Investor Bond Market (QIBM). Launched at the start of August 2021, there were more than 1,000 newly listed bonds on QIBM in its first year.

Most recently, the QIBM proposition has been further enhanced through a detailed revision of its post-listing continuing obligations to ensure it reflects a proportionate regulatory and disclosure regime for all bond products and structures.

Listings on QIBM during the first half of 2022 have included investment grade corporate bonds, high yield bonds, private equity debt securities, securitisations, sovereign bonds, convertible bonds and profit participating notes.

The volumes are marginally lower than the same period during what was a record 2021 and actually if you look closer they were on a par with last year when excluding the impact of high yield bonds.

TISE remains the leading European venue for listing high yield bonds and the slowdown is a function of high yield market being particularly impacted by the wider economic backdrop. Lenders have shown significant risk aversion and issuers have paused issuances as rates and yields made borrowing more expensive.

There is a relatively healthy pipeline in institutional loans and high-yield bonds earmarked for M&A and LBO transactions which should precipitate listings in the future.

In terms of other trends, there was a 7.6% increase year on year in private equity related listings on QIBM during the first half of 2022. The private equity sector remains very strong with a significant amount of capital to be deployed and TISE remains the leading venue for the listing of securities related to this transactional activity.

There have also been more investment grade corporate bonds, sovereign bonds (including another bond from the States of Jersey) and securitisations listed on QIBM during the same period.

Securitisation listings increased by 10% year on year and included prominent deals from major international banks backed by a range of asset classes including auto loans, credit card receivables, loans to SMEs, as well as residential and commercial mortgage-backed securities.

Sustainability is a key item on everyone's agenda now, so what has been happening at TISE in terms of related listings?

TISE bond listings are including a growing number of sustainable bonds. In July 2021, we became a Partner Exchange of the United Nations' Sustainable Stock Exchanges Initiative (UN SSE) and we launched our comprehensive sustainable market segment, TISE Sustainable.

TISE Sustainable is open to issuers and securities from across both our bond and equity markets who are independently assessed as complying with an internationally recognised framework or rating which demonstrates their environmental, social or sustainable credentials.

Since its launch, we have admitted sustainable issuers, green bonds, sustainable bonds, sustainability-linked bonds and humanitarian catastrophe bonds to TISE Sustainable.

At the end of June 2022, there were more than £13 billion of listings on TISE supporting environmental, social and sustainable initiatives, which demonstrates the role we can play as a facilitator of global sustainable capital flows.

> We have an increasingly diversified and scalable business model which puts us in an excellent position to make the most of the opportunities which will emerge, not least when more buoyant market conditions return

You've talked about a strategy of diversification, and we can see that in terms of the bonds you are listing but what about the geographical origin of the business?

There has been continued growth and internationalisation of member firms who facilitate business on the Exchange.

Building on the success in this regard during 2021, so far during this year there have been two new Member firms from Ireland and one from Jersey.

This means that most of the leading listing agents for Euronext Dublin's GEM market are now Members of TISE and in a position to directly facilitate listings on our market.

As well as strengthening TISE's credibility and visibility amongst the advisory community, the geographic expansion in the membership underpins the delivery of our strategy to diversify and scale up our bond listings in the UK, Europe and internationally.

In H1 2022, the UK remained the largest single domicile of issuers with listed securities on TISE, but more than 25% of all

issuers listing securities on TISE in the first half of the year were domiciled in the European Union, predominantly Luxembourg, Ireland, and The Netherlands, as well as France, Germany, Italy, and Sweden.

Have there been any more developments regarding trading activity or other services?

In February, we launched our new bespoke auction trading system, NOVA. The auction platform provides an automated price discovery and transaction model which delivers even greater value to our current equity issuers. NOVA also provides us with a flexible platform which can be adapted to support new products and services, including a prospective private markets offering.

Indeed, we have continued to explore opportunities to launch our own offering within the private markets. This has included partnering with a selected potential customer to explore beta testing of an initial product concept which we intend to bring to market by the end of the year.

Utilising our NOVA trading system and expertise in the regulated market, we are well positioned to provide an efficient and scalable private market facility for private companies and private funds.

Could you summarise your plans for the future?

We remain focused on executing our strategy to add significant scale in our core markets and service a diversified range of products. I am pleased with the progress we have made in executing our strategy, despite the challenging macro-economic environment.

We have an increasingly diversified and scalable business model which puts us in an excellent position to make the most of the opportunities which will emerge, not least when more buoyant market conditions return.■

Cees is the Chief Executive Officer of The International Stock Exchange Group Limited, a position he has held since November 2020. He is responsible for all aspects of leadership and management of the Company. With a strong focus on strategy, business development and infrastructure, he aims to work with, and create enhanced value for, the Group's stakeholders, including its staff, members, issuers and shareholders.

Cees has more than 20 years' experience within international financial market infrastructure. He has held senior executive positions within several international exchanges, including CEO of CME Europe Ltd, CEO of Euronext Amsterdam and Head of European Cash Markets for NYSE Euronext. Prior to that, he spent a decade working in IT and programme management roles within leading Netherlands based companies Philips and Delta Lloyd Group.

Cees holds a degree in Business Administration and Industrial Engineering from The Hague University of Applied Sciences in the Netherlands.

A story of tailwinds and headwinds

Agustín Carstens is General Manager of the Bank for International Settlements

Introduction

My remarks will reflect on aggregate supply's importance for macroeconomic stabilisation. We are used to viewing the economy mainly through the lens of aggregate demand, with supply assumed to adjust smoothly in the background. But we need a more balanced approach. Signs of fragility in supply have been ignored for too long.

Recent events have shown the dangers of doing this. Reinvigorating productivity growth and enhancing the flexibility and resilience of supply will have to play a larger role in policy debates going forward. Let me elaborate on these thoughts.

An era of supply tailwinds

In the three decades leading up to the pandemic, four criss-crossing tailwinds made aggregate supply highly responsive to shifts in aggregate demand: a relatively stable geopolitical environment, technological advances, globalisation and favourable demographics.

A relatively stable global political landscape arose around the broad consensus that free markets and cooperation would support economic growth. At an international level, this helped forge trade agreements that drew more countries into global production networks.

At a domestic level, it helped strengthen market forces through privatising state enterprises, deregulating labour, product and financial markets, and legal improvements, including more secure property rights.

Liberalised and globalised markets, in turn, disciplined policymaking, as they made it harder to deviate from prudent approaches and helped spread best practices, such as inflation targeting.

At the same time, technological advances pushed down costs, made time and physical distance less of a constraint on economic activity and thus provided the basis for a lift in global productivity[1].

Intertwined with these political and technological developments, globalisation expanded the world production frontier. Globalisation in goods and factor markets gave firms access to a larger consumer base, a wider pool of resources, access to international know-how and chances for specialisation.

Financial globalisation alleviated constraints. As a result, more productive capacity was brought online and opportunities for efficiency gains and cost reductions were exploited on a global scale.

Meanwhile, demographic trends were favourable. The working age share of the global population grew rapidly from 1970 onwards. In advanced economies, baby boomers injected a large cohort of workers into the job market from the 1980s.

And trade brought the previously untapped young workforces of emerging market economies into the global labour pool.

These tailwinds fostered growth alongside low inflation in several ways (Figure 1). A key one was by loosening the link between domestic economic activity and inflation (Forbes (2019)).

Access to cheaper production locations drove inflation down. More contestable domestic markets and sharper international competition weakened the pricing power of firms and bargaining power of workers. And because countries – especially advanced economies – could more easily tap global resources, domestic supply constraints became less binding.

As a result, Phillips curves flattened (Borio (2017))[2] and global – rather than domestic – slack increasingly became the key driver of inflation (Borio and Filardo (2007), Boissay *et al* (2021)).

At the same time, the tailwinds also made supply more responsive to changes in demand. Producers could easily access a network of worldwide suppliers. This allowed them to take advantage of the best available prices. After disruptions, supply would generally adjust quickly to new demand patterns.

A build-up of fragilities

The supply tailwinds produced a business cycle distinct from that seen in the post-war period. With inflation low and stable, monetary policy had less need to tighten during expansions than in the past. And in recessions, central banks were usually

in a position where they could provide forceful stimulus, confident that inflation would remain under control.

Fiscal policy also had more leeway, as nominal and real interest rates fell to their lowest levels since records began. But, even though macroeconomic conditions remained benign, fault lines emerged.

Low productivity growth was a key warning sign. In advanced economies, it plunged during the Great Financial Crisis (GFC) and never fully recovered, part of a longer decline going back at least to the late 1990s (Figure 2). In emerging market economies, the productivity boost from integration into global networks and structural reforms proved to be fleeting. The post-GFC slowdown has been the steepest and most prolonged of the past three decades.

In retrospect, some slowdown in productivity growth was probably inevitable. Liberalising reforms that improve the quality of institutions[3] can deliver rapid productivity gains. But these naturally slow as countries exploit them and approach the productivity frontier. Incremental improvements in institutional quality become harder to achieve.

That said, there is no hiding the fact that the growth-enhancing structural reform drive prevalent during the 1990s and early 2000s slowed significantly in many countries (Figure 3). There are many possible explanations for this. Vested interests resist changes. And, as the benefits of structural reforms accrue only in the longer term, they usually rank low in governments' priority lists.

Paradoxically, the supply side tailwinds may also have played a role. Plentiful global supply and low inflation concealed the costs of low productivity. In consequence, governments lost the appetite for technically difficult – and often politically unpopular – structural reforms. The can was kicked down the road[4].

"The sooner policymakers recognise the need for a reset and commit to sustainable growth strategies focused on revitalising the supply side, the stronger and more resilient the global economy will be"

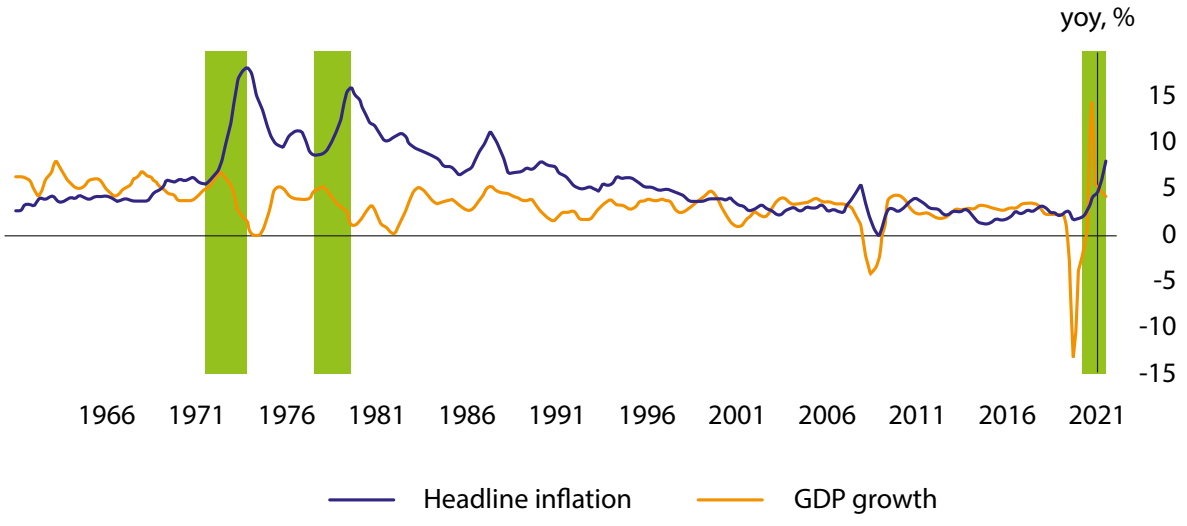
Missing the lift that robust productivity growth could have provided, economies had to rely on other sources of growth. Expanding financial systems provided an impetus, at least until the GFC – when the engine of growth fuelled by debt and driven by demand sputtered.

Crucially, this was not neutral for potential growth, as indicated by the break in productivity patterns I mentioned earlier. And fiscal and monetary policies were increasingly called upon to sustain output. Although obscured by acceptable growth, the constraints were increasingly visible, even before the pandemic.

Economies were becoming fragile as private and sovereign debt levels reached historical highs (Figure 4) and inequality rose. The room for policy manoeuvre was eroding, with policymakers forced to do ever more to bring economies back to trend after each downturn[5].

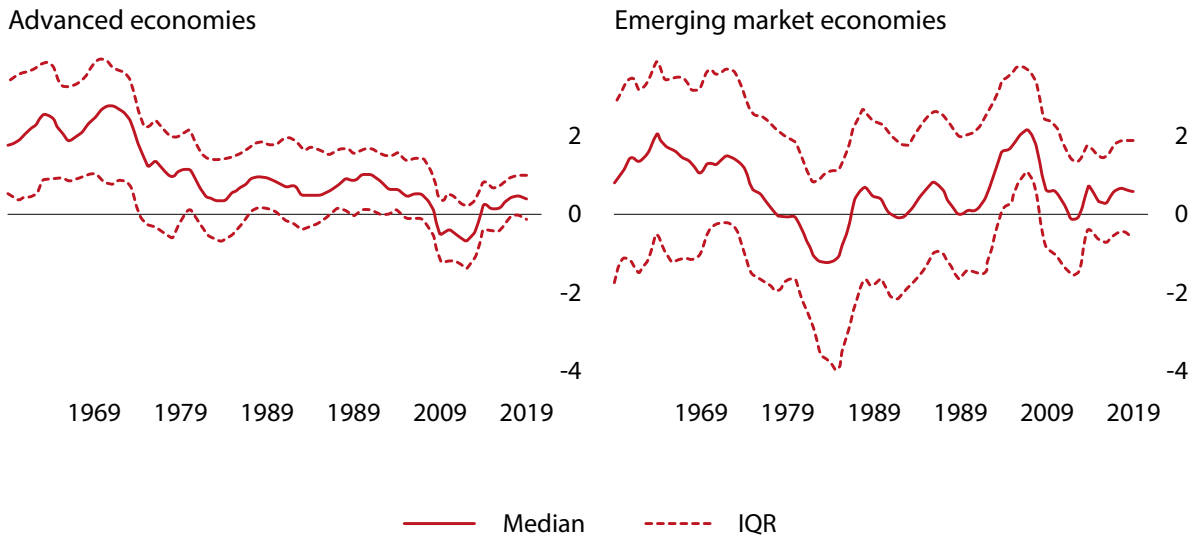
Nonetheless, with supply side tailwinds still lending support, increased reliance on demand management did not lead to higher inflation.

Figure 1. Mostly solid growth and low inflation characterised much of the decades before COVID-19



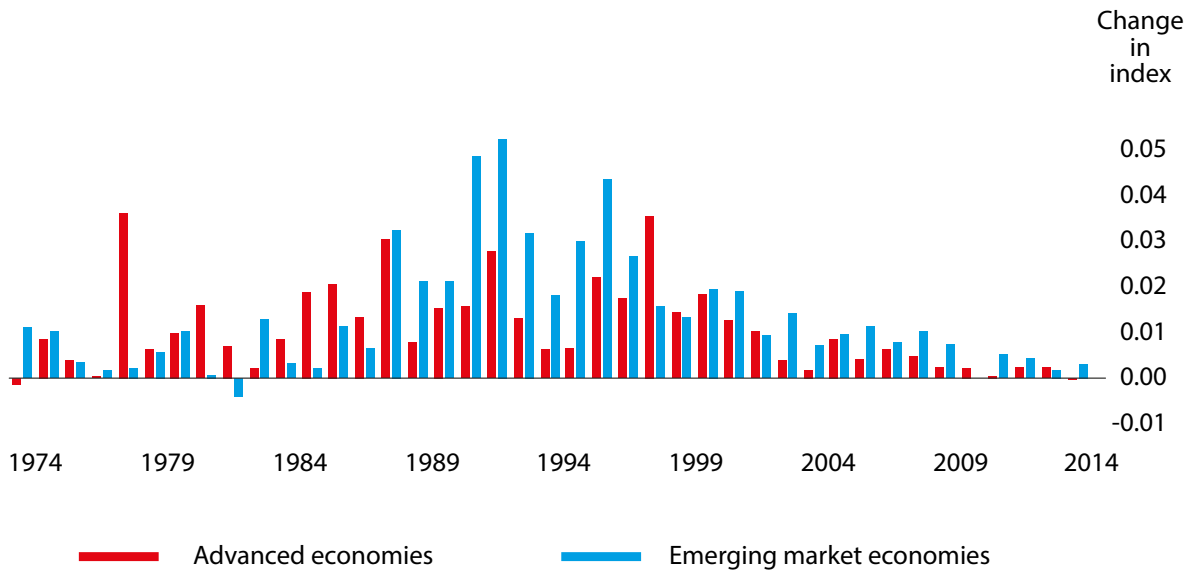
Notes: Weighted averages based on GDP and PPP exchange rates across 10 advanced economies (AU, CA, DK, EA, GB, JP, NO, NZ, SE and US) and 11 emerging market economies (CL, CO, IN, KR, MX, MY, PH, SG, TH, TR and ZA). Green shaded areas represent persistent inflation periods, where the cumulative rise in inflation was above 5.5 percentage points.
Sources: OECD; World Bank; Global Financial Data; national data; BIS.

Figure 2. Productivity growth has been difficult to keep up (in per cent)



Notes: Five-year moving averages of median and interquartile ranges of year-on-year changes in total factor productivity at constant national prices. Advanced economies: AT, AU, BE, CA, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IS, IT, JP, LU, MT, NL, NO, NZ, PT, SE and US; emerging market economies: AR, BR, CL, CN, CO, CZ, EE, EG, HK, HR, HU, ID, IL, IN, KR, LT, LV, MA, MX, MY, PE, PH, PL, PY, RO, RU, SA, SG, SI, SK, TH, TN, TR, UA, UY and ZA; where data are available.
Sources: Penn World Table, version 10.0; BIS.

Figure 3. Structural reforms largely stalled in the 2000s



Notes: Change in average reform index computed as the arithmetic average of indicators capturing liberalisations in five areas: domestic finance (regulation and supervision), external finance (capital account openness), trade (tariffs), product market (network industries) and labour market (job protection legislation). The index ranges from 0 to 1, with higher scores indicating greater liberalisation.
Sources: IMF, BIS.

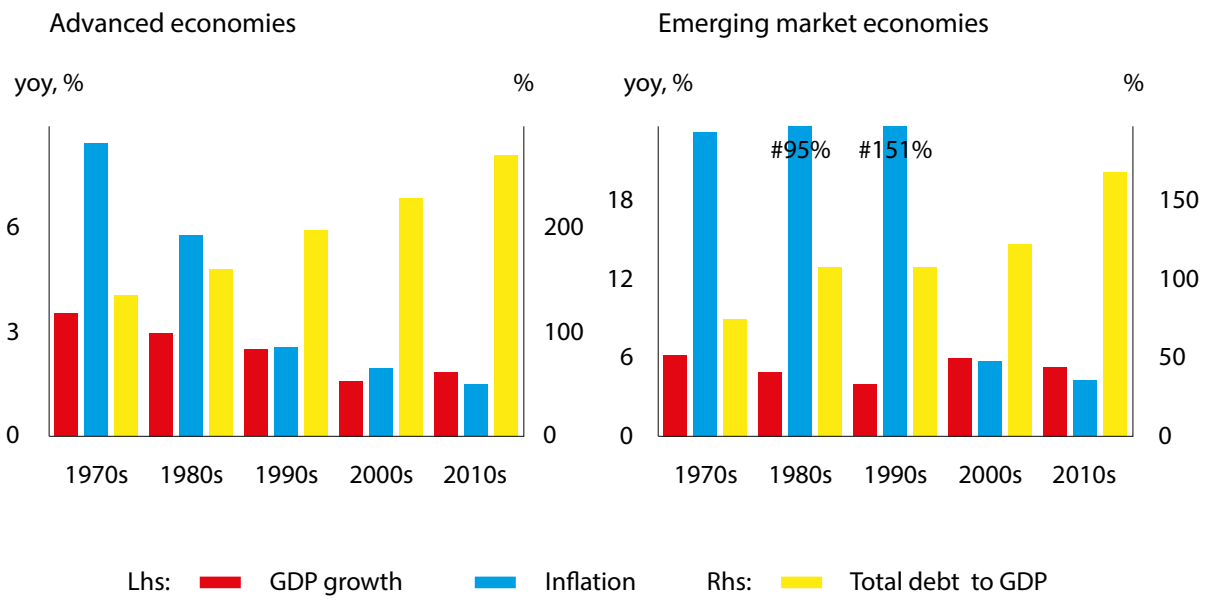
Indeed, in many parts of the world, the key challenge for central banks on the eve of the pandemic was to bring inflation back up to target. The winds were about to change, however.

A rude awakening

The pandemic and the war in Ukraine have been a rude awakening both in an economic and humanitarian sense. To be sure, both were exceptional shocks that arose from exogenous causes.

But they painfully revealed that the supply side could only be stretched so far. This made demand side policy responses far harder to calibrate. I draw several lessons from this experience. First, to fight the pandemic it was decided to bring the global economy intentionally to an immediate standstill in mid-air.

Figure 4. Debt levels climbed as inflation came down



Notes: Decade average of respective variables where regional aggregates are computed as weighted averages based on GDP and PPP exchange rates. Advanced economies: AU, CA, CH, DK, EA, GB, JP, NO, NZ, SE and US; emerging market economies: AR, BR, CL, CN, CO, CZ, HK, HU, ID, IN, KR, MX, MY, PE, PH, PL, RU, SG, TH, TR, TW and ZA; where data are available. 2 Sum of public and non-financial private sector debt.
Sources: IMF; World Bank; Global Financial Data; national data; BIS.

But turning on and off supply is not like turning on and off demand. With the benefit of hindsight, it was perhaps naïve to expect that it would be possible to easily reignite the growth engine, quickly recover speed and again fly smoothly. We now know better.

The second lesson is that we cannot take the availability of aggregate supply for granted. The global supply networks that adjusted smoothly to changes in aggregate demand turned out to be far less resilient than we thought. Seemingly robust supply chains broke down in the face of disruptions to a few key production inputs.

The final lesson is the sensitivity of inflation to supply constraints. Policymakers had grown accustomed to decades of ample supply, and, with no experience in calibrating stimulus to restart an engine that had been intentionally switched off, reached for their familiar demand side tools.

These had boosted growth in the past, without stoking inflation. The consequences for inflation when supply could no longer keep up caught many of us off guard.

As tailwinds turn into headwinds

Looking further out, a key challenge I see is that even if the specific supply disruptions caused by the pandemic and the war fade, the importance of supply side factors for inflation is likely to remain high.

This is because the global economy seems to be on the cusp of a historic change as many of the aggregate supply tailwinds that have kept a lid on inflation look set to turn into headwinds.

If so, the recent pickup in inflationary pressures may prove to be more persistent. Let me consider three of the forces I noted earlier: geopolitics, globalisation and demographics.

Even before the war in Ukraine, the political environment had been growing tense and less friendly to the principle of international cooperation.

This backlash reflects, in part, the course globalisation has taken: the perceived uneven distribution of benefits within and across countries and discontent with local and global governance mechanisms.

Greater inequality has given rise to populism, which has threatened the rules-based international trade and finance system, and more broadly democratic norms and institutions, including independent central banks (Goodhart and Lastra (2018), Borio (2019)). Thus, it is not surprising that globalisation has been losing steam.

Other, more structural, factors have also weighed on global trade integration. As emerging market economies converge to their richer trade counterparts, comparative advantage on the basis of wages narrows.

Advances in robotics and information and communications technology (ICT) that decrease the relative importance of labour in production processes could also favour local production and discourage global goods trade[6].

Recent developments could accelerate this trend further. The pandemic revealed the fragility of global supply chains that prioritised cost reduction above all else.

The war in Ukraine has rattled commodity markets and threatened energy and food security. It has also accelerated the realignment of geopolitical alliances.

As a result, access to global production networks and international financial markets can no longer be taken for granted. A reconfiguration of global value chains could well follow. Some of these developments may be warranted. But we should not imagine that they will be costless.

Meanwhile, demographic tailwinds are set to reverse, and labour may not be as abundant as it used to be. The baby boomers are retiring. The pandemic may leave a persistent imprint on both the quantity and quality of workers.

Labour force participation rates remain below pre-pandemic levels in many countries, signalling a potential shift in attitudes towards work. Lost schooling and disruptions to regular healthcare services during the pandemic could scar human capital. International labour mobility also faces increasing obstacles.

Moreover, even as these tailwinds turn into headwinds, new headwinds are emerging. In particular, the threat of climate change calls for an unprecedented policy-induced reallocation of resources. And it will only intensify war-induced food and energy bottlenecks.

Increasing extreme weather events and an interconnected global food supply system raise the risk of disruptions and higher, more volatile prices, not to mention human costs[7].

Expectations of a shift away from fossil fuels have deterred investment (Meyer (2022)), threatening energy shortages before clean energy options can catch up to meet demand. This pushes up inflation.

Policies to deliver the lift needed and avoid the stall

This new and more hostile supply environment has sobering implications for economic policy. We may be approaching what in aviation is called a 'coffin corner', the delicate spot when an aircraft slows to below its stall speed and cannot generate enough lift to maintain its altitude.

It takes skilled piloting to get the aircraft back to a safer, stable place. Continuing to rely primarily on aggregate demand tools to boost growth in this environment could increase the danger, as higher and harder-to-control inflation could result.

So what needs to be done? Getting the economy back to a durable path starts with a reset to macroeconomic policymaking. As demand side policies cannot substitute for supply tailwinds, we need to be realistic about what these policies can deliver and more keenly aware of the associated costs.

When economic disturbances come from supply as well as demand, the 'divine coincidence' breaks down. In this environment, central banks cannot hope to smooth out all economic air pockets, and must instead focus first and foremost on keeping inflation low and stable (BIS (2022)). Monetary policy needs to meet the urgent challenge of dealing with the current inflation threat.

Fiscal policy should also be aware of tighter limits on what demand management policies can deliver. In a world of unforgiving supply, what fiscal stimulus adds to demand may need to be taken away by monetary policy tightening.

Scarce fiscal resources should instead be used to tackle supply constraints head on, including those imposed by climate change, ageing populations and infrastructure, through growth-friendly actions and support for broad structural reforms. Such a focus on reinvigorating growth through the supply side could also create scope to rebuild fiscal buffers.

The aim should be to create a dynamic, nimble environment encouraging innovation, enhancing resilience and supporting the required institutional, technological and ecological transitions.

Policymakers should focus on fostering investment in healthcare to better protect human capital. They should also promote investment in climate-friendly industries and all types of infrastructure, including digital.

Priority areas of action should involve competition, labour and education policies to provide and sustain the much-needed innovative impetus.

At the same time, reaping the benefits of technological innovation requires a favourable regulatory and legal environment. Efforts to make the financial system more balanced yet more innovative go hand in hand with reforms on the real side.

Sustaining international cooperation in the face of rising protectionist and populist impulses will also be important. One solution could be to promote a 'better' and more sustainable form of globalisation, rather than scaling back trade integration in a major way[8]. This would strike a balance between resilience, sustainability and efficiency[9].

We can achieve it by giving businesses incentives to set up shorter or more diversified supply chains when the social benefit exceeds the private cost, and by leveraging new technologies to monitor and stress-test systems.

These new arrangements would also have to recognise the redistributive implications of integration and offer concrete remedies, taking to heart the lessons that not all members of society have benefited from globalised trade and finance.

Let me conclude. As any pilot will tell you, when the warning lights flash, there is a premium on timely and decisive action. The sooner policymakers recognise the need for a reset and commit to sustainable growth strategies focused on revitalising the supply side, the stronger and more resilient the global economy will be.

If we manage to do that, new tailwinds may well develop, with substantial benefits for both growth and price stability. ■

Endnotes

1. Intermodal standardised freight containers, introduced in the 1950s and widely adopted over the subsequent decades, drastically lowered shipping costs and boosted international trade (Bernhofen et al (2016)). In the meantime, the information and communication technology (ICT) revolution made it easier for firms to operate on a global scale (Baldwin (2016)), while improving production processes and opening up new business opportunities.

2. Globalisation also affected inflation through commodity prices. The increased importance of emerging market economies and their higher demand for raw materials meant that global commodity prices became more tightly linked to growth in emerging market economies – particularly in China. Given more volatile growth in these economies, this development contributed to sharper commodity price swings. As a result, global commodity price movements came to explain a larger share of the variance in inflation. See Forbes (2019) for more on this effect.

3. These institutions include the rule of law, property rights, competition and human capital. The importance of each factor may vary across countries. For instance, in emerging market economies rule of law and property rights are key to the development of a stable financial system for intermediating domestic savings and to making the most of foreign capital to benefit supply, not least through diffusion of know-how. For advanced economies, competition, labour market and education policies are instrumental to remain on the knowledge frontier and ensure that gains from global integration and technological advances are distributed evenly.

4. Meanwhile, the productivity-enhancing promise of many technological developments – particularly in the information and communications technology (ICT) sphere – has not been realised. Indeed, many new technologies such as big data and artificial intelligence seem to have favoured incumbents and further encouraged concentration, limiting the spread of productivity across the economy. Other explanations for the puzzling discrepancy between rapid ICT innovation and slow aggregate productivity growth include the arguments that the economic benefits of these new technologies are overblown, that productivity is mismeasured or that the gains will take time to emerge given the necessary investment for adoption, including training of current and prospective workers to acquire the skills needed for the digital workplace. See Mihet and Philippon (2019) for a detailed discussion.

5. Aggressive monetary policy easing could create conditions that make it necessary to maintain extraordinary accommodation. One possibility is the potential link between monetary policy and the natural interest rate, eg. due to the former's effect on debt (Mian et al (2021)) or because the act of policy easing leads the public to believe that the natural interest rate has declined and save more as a result (Rungcharoenkitkul and Winkler (2021)).

6. Conversely, technological advances could facilitate an increase in trade in services and intangibles. Such a shift away from tangibles to intangibles has already taken place in several economies and could explain some of the productivity slowdown. Bailey (2022) shows that, between 2000 and 2007 in six advanced economies, intangible-intensive industries had a more pronounced slowdown in productivity growth than tangible-intensive industries did.

7. The global food system involves production, transport, processing, packaging, storage and retail. It feeds the great majority of the world population and supports the livelihoods of over 1 billion people (Mbow et al (2019)).

8. For views on what such forms of globalisation could look like, see Rodrik (2011) and Wolf (2019).

9. For a discussion of the importance of resilience in promoting macroeconomic stability, see Brunnermeier (2021).

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At the heart of global markets

Elise Donovan is CEO of BVI Finance

International financial centres, such as the British Virgin Islands (BVI), remain vital cogs in boosting the global economy by enabling investment, facilitating sophisticated transactions, and making for a more efficient global marketplace.

The BVI's international business and financial centre has continued to go from strength to strength in recent years despite devastating hurricanes, the COVID-19 pandemic, and other global political and geo-economic challenges.

The resilience and agility displayed has enabled the BVI to overcome these challenges with gusto, a trait that the BVI has demonstrated time and time again.

Not only does it attract companies and individuals from around the world to do business, but the BVI also plays a pivotal role in supporting the growth of the global economy.

This continued success lies in the expertise and services that the BVI offers across the whole lifecycle of a company, from incorporation, through mergers and acquisitions, public listings, privatisation, digitalisation, restructuring, litigation, insolvency, and liquidation.

These services are provided by a network of BVI-specialised practitioners from the world's leading corporate firms, trust companies, law firms and accounting firms. The jurisdiction's tax neutrality, agile corporate framework, low administrative costs, and strong legal sector have long created the perfect ecosystem to conduct business.

The BVI's commitment to a robust regulatory framework and international standards, in lock step with its dedication to driving innovation in financial services, have also been key components of its success.

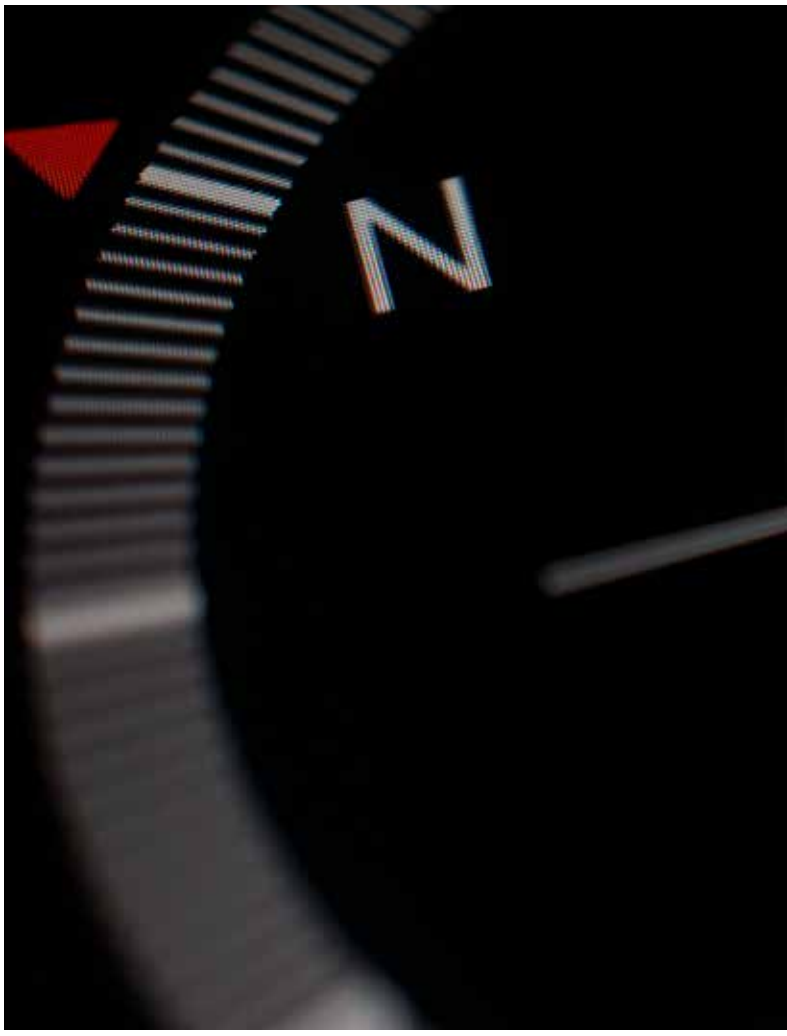
This has resulted in companies choosing the BVI as a premium jurisdiction, making it the largest offshore international finance centre for company incorporations and related business. So far, in 2022, the BVI saw the highest number of first-quarter new incorporations in four years.

Moreover, in the first half of 2022, BVI financial services firms acted on tens of billions of high-value, sophisticated transactions, from initial public offerings (IPOs) and registered direct offerings (RDOs) to complex debt restructuring and launching new funds. Below are some of the highlights:

M&A

BVI Financial Service firms have advised companies on all aspects of mergers and acquisitions (M&As) across various sectors.

For example, in the technology sector, law firm Mourant advised Nasdaq Stockholm-listed Stillfront Group, a



powerhouse of gaming studios, on the $201 million acquisition of Six Waves Inc, a BVI company.

The acquisition of the computer game developer included an earn-out capped at US$100 million and will add to Stillfront's diverse and exciting games portfolio.

In infrastructure, law firm Maples and Calder provided BVI counsel to SCC Power on its acquisition of the business enterprise of Stoneway Capital Corporation, consisting of four power generation facilities in Argentina.

As part of the acquisition, SCC power issued a total of $527 million in lien notes to certain Stoneway creditors and interest holders. The move has allowed SCC Power to stabilise operations and enhance cash flow generation.

The BVI's close links to Asia continued to play an important part in its international offering when law firm Harneys acted as the BVI counsel to Hong Kong-listed NWS Holdings Limited for its $340 million acquisition of logistics properties in China from Goodman China Logistics Partnership.

The transaction marked a major milestone in NWS's expansion into the logistics property market and is a prime example of companies benefiting from the jurisdiction's global presence and expertise.

"The [BVIs] tax neutrality, agile corporate framework, low administrative costs, and strong legal sector have long created the perfect ecosystem to conduct business"

Take-private

Take-privates are a rarity in international finance. This year, BVI financial services firms have been instrumental in several significant deals, including Ogier representing the Atairos group in a ground-breaking $580 million take-private of Ocean Outdoor Limited, which operated the famous Piccadilly Lights screen in London. The innovative use of a BVI Statutory Merger allowed the transaction to be completed without involving the courts.

In healthcare, Walkers functioned as BVI legal counsel to Pfizer Inc. on its US$11.6 billion acquisition of NYSE-listed Biohaven Pharmaceutical. The take-private transaction was implemented by way of a BVI statutory merger. The resulting

merger is the largest ever takeover of a publicly listed BVI company by transaction value.

Additional capital

As a global financial centre, the BVI is perfectly positioned to facilitate multi-jurisdiction deals. Earlier this year, Harneys acted as BVI counsel in the $130 million term loan financing of Adium Pharma S.A. by a consortium of lenders across five jurisdictions, mainly in South America.

Law firm Ogier advised on an extension and increase of a multi-currency revolving credit facility for real estate investment firm Colliers. The deal increased Colliers' borrowing capacity from $1 billion to $1.5 billion. The additional capital will be linked to sustainable projects sustainability as part of Colliers' Elevate the Built Environment framework.

Following the launch of Marwyn Acquisition Company II on the London Stock Exchange, law firm Conyers advised on the $577 million funding round.

After the successful launch of that 12-month placing programme, Conyers advised Marwyn Acquisition Company III on an additional $577 million share issuant, bringing the total funding rounds to $1.2 billion.

Restructuring

The BVI's distinctive restructuring framework provides firms in the jurisdiction the ability to effectively assist in restoring business viability for companies as well as offering leading insolvency services.

Recently, Ogier in the BVI advised the Hong Kong-based global commodities trading business, Noble Group, on its $1.3 billion financial restructuring, which was implemented through a lender-led BVI share pledge enforcement. The restructuring de-leveraged the group and transitioned part of the ownership to its noteholders.

Investment/funds

The investment funds sector in the BVI has also been an area of focus and growth. For example, O'Neal Webster has advised on the formation or conversion of multiple open-ended investment funds in the first two quarters of 2022 and several approved manager applications for clients primarily based in North America and Asia.

In addition, Walkers' BVI office acted as counsel to The Central America Bottling Corporation in relation to its $1.1 billion offering in the first US dollar-denominated Sustainability-Linked Bond (SBL) by a bottling company in the region.

The offering also broke new ground by being the first SLB by a Central American issuer and the second largest single tranche SLB by a Latin American issuer ever.

Digital assets

The BVI continues to champion innovative technologies and asset classes. Building on the reputation and success of its excellent corporate product, the BVI has become a beacon for innovative companies in the digital asset space.

Earlier this year, two such companies, a global energy-saving bitcoin mining operator - SAITECH Limited - and a clean-tech company that integrates Bitcoin mining, heating, and power industries - TradeUP Global Corporation - completed their 'De-SPAC' business combination.

As a result, transaction values for the company reached $188 million, up from $8 million in the first half of 2021. Harneys acted as BVI to SAITECH over the acquisition of TradeUP Global Corporation, a publicly traded special purpose acquisition company.

The BVI has become an attractive crypto destination because of its success in balancing innovation with a robust and stringent regulatory landscape.

In February this year, Chainswap, a BVI incorporated company that provides for 'cross-chain bridging' - the process of synthetically transferring cryptocurrency tokens between different blockchains - was hacked on at least one occasion.

ChainSwap sought urgent ex-parte relief in the Commercial Court to recoup the stolen assets. In a first for the BVI, the Court granted a worldwide freezing order against the persons unknown accused of stealing the digital assets.

Similarly, advisory firm Teneo BVI, after being appointed by the court, took control of high-profile Three Arrows Capital assets, the $10 billion crypto hedge fund that the courts ordered liquidated.

This September the BVI Financial Services Commission granted an investment business license to Huobi subsidiary Brtuomi Worldwide Limited (BWL) to operate a virtual asset exchange.

BWL plans to offer a range of crypto trading services, including spot trading of cryptocurrencies like Bitcoin and Ether as well as derivatives trading.

According to the company, they are the first digital asset trading platform operator in the BVI, licensed to run an institutional-grade crypto trading platform for both professional and retail investors.

Huobi is one of the world's largest exchanges, processing over $3.5 billion in combined spot and derivatives trading volume daily from traders in 160 countries.

Going from strength to strength

As these examples show, the experts doing business in the BVI's international business and finance centre are engaged in the types of substantive, high-value transactions essential to the functioning of global markets.

The BVI's financial services sector's ability to remain resilient and prosper while operating in a shifting economic and regulatory landscape has enabled the jurisdiction to remain competitive and consolidate its position as one of the world's leading international financial centres. ■

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Making sense of ESG data

Martijn Groot is VP Marketing and Strategy at Alveo

Until recently, environmental, social and governance (ESG) data management was at a low level of maturity across both the buy side and sell side. Although there have been reporting frameworks in place for decades including the principles for responsible investment (PRI) and global reporting initiative (GRI) standards, the absence of standard data collection, integration, and reporting solutions often required firms to create their own 'ESG data hub' to provision their own analysts, front office, and client reporting teams.

This situation is rapidly changing. Financial services firms are recognising the key role ESG metrics play in decision-making across the investment management process.

Not only does ESG data inform new product development, asset allocation and client reporting in an increasingly competitive market, but the regulatory push towards the disclosure of ESG information under the Sustainable Finance Disclosure Regulation (SFDR) means that asset managers are required to report on the ESG metrics of their portfolios.

SFDR also requires proper documentation as to the sources or models behind the reported information. Data preparation processes need to withstand rigorous scrutiny, as regulators demand the ability to explain figures and are increasingly conscious of the issue of greenwashing

This has far-reaching ramifications for financial services firms globally. Any firm that sells or distributes investment products into the European Union will have to follow the SFDR regulation. SFDR requires firms to report on mandatory Principal Adverse Impact (PAI) Indicators as well as some optional ones.

Paradoxically, the reporting requirements for the publicly listed companies that asset managers invest in lag behind the SFDR timetable. This causes an information gap and the need to supplement corporate disclosures with third party ESG scores, expert opinion, as well as internal models to come to an overall assessment of ESG criteria.

However, the regulatory environment for ESG data is far from the only factor driving growth in ESG data management.

In recent Alveo research that polled the views of 300 asset owners and asset managers in the UK, US and Asia-Pacific, just 21% of the survey sample cited 'regulatory reporting' as a key driver of their use of ESG data. This indicates that beyond regulatory compliance enhancing their ESG data management is something firms see as a must do to boost the overall value of their business.

Regulation has an important role, of course, but firms are increasingly investing in an ESG data management capability today because they understand the broad benefits that it will bring to their business rather than being forced to do so by the need to comply with the latest rules and stipulations.

Need for enhanced ESG data management

This growing need for ESG data will impact a vast array of financial services businesses worldwide. Asset management firms are increasingly concentrated on optimising their ESG data management and doing so quickly.

The Alveo research found that well over nine out of ten (95%) of the sample are looking to improve their ESG data management. 32% are looking to do so in the next six months, with 80% in total looking to do so within a year.

There is also a need for ESG-data for the banking industry. For instance, in corporate banking, ESG data is increasingly crucial to support customer onboarding and, in particular, Know Your Client (KYC) processes.

On top of that, banks will have to report their 'green asset ratio' – in essence, the make-up of their loan book - in terms of the mix of business activities of the companies they lend to, categorised according to the EU Taxonomy.

In the future, if a company signs up in order to obtain a loan from a bank as part of the screening criteria, it will be asked to disclose what kinds of business activities it is involved in and what kinds of sustainability benchmarks it has in place.

"ESG data management and quality challenges are very real and the inability to surmount them significantly impairs the ability to meet new and evolving standards, regulations and industry best practice protocols"

Banks and other sell-side financial services firms will also frequently screen their suppliers, as part of a process called Know Your Third Party (KY3P). They will want to know who they are doing business with, so they can then report this in their own Annual Report.

Banks will also want to climate stress test the products they hold in their trading book for their own investment against certain climate scenarios.

The European Central Bank (ECB), the Monetary Authority of Singapore (MAS), as well as the Bank of England have all incorporated climate stress test scenarios in their overall stress testing programmes to gauge the solvency and resilience of banks.

ESG data also has a role to play in the way banks manage their mortgage book as they are increasingly looking for geospatial and climate data, for example, to work out the flood risk of the properties they finance.

This is information that was previously typically used by (re) insurance firms but that will now be used more broadly in the financial services industry.

Both sell-side and buy-side financial services companies will also need to integrate ESG data with data from the more traditional pricing and reference providers to give a composite view, incorporating not just the prices of instruments and the terms and conditions but also the ESG characteristics.

Scoping the challenge

ESG data needs to be anchored across the organisation, integrating with all the different data sets to provide a composite picture, becoming a key source of intelligence, not just for the front office but also for workflows in risk, finance and operations.

Given that need, it is perhaps unsurprising that the Alveo research finds that 80% of businesses are aiming to improve their ESG data management within the next year.

However, for many firms, this may be easier said than done. Sourcing accurate ESG data and properly interpreting it is a particular challenge, as information needs to be gathered from a wide array of data sets including third party estimates, ratings, news and corporate disclosures.

Corporate disclosures especially are still patchy and sometimes difficult to come by, while the withholding of relevant data means that records are frequently incomplete or held in silos.

This inevitably impacts the effectiveness with which key data is distributed and disseminated to senior leaders and decision-makers. In some cases it is simply missing.

Usability issues include the disparity in methodologies third-party firms use to estimate or score firms on ESG criteria. Rating firms have their own input sets, models and weights and often come to different conclusions. Compared to credit ratings, the correlation between the scores given to a firm by different rating agencies is lower.

However, credit analysis is as old as the banking industry and the metric gauged (probability of default) is clear. It could be that, with increased global disclosure standards under IFRS, ESG scores will converge.

Comparability issues in ESG are exacerbated by different standards, different reporting frequencies or calendars and also the lack of historical data to track progress and benchmark performance over a longer time period.

The biggest challenge in many firms, however, is how to embed the ESG data in a range of different business processes to put users on a common footing. This requires the capability to quickly onboard new data sources, integrate, harmonise and vet that data, fill in the gaps where needed and provide it to users and business applications.

Achieving all this is far from easy. The data management structure and model is not always clear and invariably siloed. It often still needs to be integrated into wider reporting, especially in finance and risk, which are typically the functions where all information flows necessarily come together. These

firms are therefore focused on improving their ESG data management and are also prepared to invest to make that happen.

Beyond pure data management, putting in place robust high-quality data governance processes and practices will also have an important role to play here in controlling access and ownership and ensuring that data usage is monitored efficiently.

Finding a solution

Accessing ESG data and ensuring it is of good quality, comparable with other ESG data sets and well-integrated within existing workflows can often be complicated.

Whenever new data categories or risk metrics are introduced, data management practices typically start with improvisation through desk-level tools including spreadsheets, local databases and other workarounds. This is gradually streamlined, centralised, operationalised and ultimately embedded into core processes to become business-as-usual (BAU).

Generally speaking, firms need to cross-reference to a comprehensive data model that covers regulatory ESG information and underlying data sets. In addition, they must achieve transparency as to which sources and what types of data are leveraged, the business rules used and any manual remediation.

Comprehensive ESG data management

A comprehensive approach to ESG data management is needed to provide consistent data to service multiple use cases. Yet, accessing ESG data and ensuring it is of good quality and well-integrated within existing workflows can be difficult.

However, data management solutions and Data-as-a-Service offerings are now available to help firms acquire the ESG information they need, the capabilities to quality-check, supplement and enrich it with their own proprietary data or methods, and the integration functionality to place users and applications on a common footing.

Achieving this demands that any challenges presented by the quality of data are dealt with from the outset. What organisations need is a process that seamlessly acquires, integrates and verifies ESG information. Additionally, historical data to run scenarios can help with adequate risk and performance assessment of ESG factors.

A data management function should also facilitate the easy discoverability and explainability of information and effective integration into business user workflows.

In short, data management should service users from the use case down, rather than from the technology and data sets up. Specific capabilities should include cross-referencing taxonomies and condensing information, for example to report on indicators that serve as performance KPIs, or that meet reporting mandates in the financial sector.

Data derivation capabilities and business rules can spot gaps, highlight outliers, whether they are related to historical patterns, or outliers within a peer group, industry or portfolio; and provide estimates where needed. Additionally, historical data to run scenarios can help with adequate risk and performance assessment of ESG factors.

The speed that the regulator has picked up with regard to enabling a sustainable economy not only confronts companies with a very tight implementation schedule, but also with major challenges regarding the sourcing, processing and quality assurance of large sets of frequently unstructured data.

Mastering this data challenge is a prerequisite for successfully competing for new market offerings and sustainable products. Early operational readiness is key to staying ahead of the curve in adapting to the new ESG regime.

The major decision points that need to be addressed right now are first, determining the target operating model and governance, second, designing the target data and system architecture and third, moving forward with a well-proven approach for a customised implementation.

Once a data management system has been put in place within an effective operating model, there are many benefits: from efficient data onboarding and provisioning business users to securing data lineage and data cost and usage management.

This significantly increases the return on any existing and future ESG data investments. Firm-wide availability will increase usage and, in turn, will benefit the whole organisation and ensure firms are optimising their data.

Towards ESG Data-as-a-Service

Because ESG data management capabilities should support a company's compliance processes end-to-end, the Data-as-a-Service model where a supplier manages the sourcing and integration but also quality management of required ESG data emerges as the preferred service model.

Research conducted among hedge funds, pension funds, insurance companies and other investment firms in the UK, US and Asia-Pacific found more than three-in-ten opted for this approach. Having capabilities in-house is good news for all stakeholders, but beyond this, drawing on the services of an expert solutions provider and adopting Data-as-a-Service models may prove to be the best route to address these challenges.

ESG data management and quality challenges are very real and the inability to surmount them significantly impairs the ability to meet new and evolving standards, regulations and industry best practice protocols.

Given the complexity and range of the challenges, there is a clear need for firms to draw on in-depth third-party expertise and use solutions that help collect, collate and validate data and offer a one-stop shop of ESG content as well as the integration of it into business workflows to put it to use. ■

Monetary policy and the Great Volatility

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The Great Moderation was a period of prosperity and broad macroeconomic stability[1]. The volatility of both inflation and output declined, the length of economic expansions increased, and people in most economies experienced sustained improvements in their standards of living.

There is broad agreement that better monetary policy was an important factor behind the Great Moderation[2]. As central banks took up the fight against spiralling inflation in the late 1970s and early 1980s, they brought down and stabilised inflation expectations at levels that provided a solid nominal anchor for firms and households.

The subsequent advance of inflation targeting around the world is believed to be a prime reason why the global financial crisis of 2008 merely interrupted the Great Moderation[3]. Afterwards, macroeconomic volatility quickly dropped back to its previous low levels.

Yet, monetary policy was not the only factor behind the Great Moderation. Good luck, in the sense of a smaller variance of the shocks hitting the global economy, is widely believed to have played an important role as well[4].

Compared with the 1970s, for example, real oil prices traded in a much narrower range from the second half of the 1980s until the mid-2000s.

The question I would like to discuss is whether the pandemic, and more recently Russia's invasion of Ukraine, will herald a turning point for macroeconomic stability – that is, whether the Great Moderation will give way to a period of 'Great Volatility' – or whether these shocks, albeit significant, will ultimately prove temporary, as was the case for the global financial crisis.

My answer to this question is that of a 'two-handed economist'. On the one hand, there is a tangible risk that the nature and persistence of the shocks hitting our economies will remain unfavourable over the coming years.

On the other hand, the decisions that central banks are taking today to deal with high inflation can shape the future course of our economies in a way that mitigates and limits the ultimate impact of these shocks on prosperity and stability.

A new era of volatility

The pandemic and the war in Ukraine have led to an unprecedented increase in macroeconomic volatility. Output growth volatility in the euro area over the past two years was about five times as high as it was at the peak of the Great Recession in 2009[5]. Inflation volatility has surged beyond the levels seen during the 1970s.

Once the exceptional effects of the pandemic and the war wash out from the data, output and inflation volatility are bound to decline.

Yet, there are valid grounds to believe that policymakers will find themselves in a less favourable environment over the medium term – one in which shocks are potentially larger, more persistent and more frequent.

Climate change is a major driver. The experience of recent years leaves no doubt that the incidence and severity of extreme and disruptive weather events are rising sharply, exposing the global economy to greater volatility in output and inflation[6].

This summer, the European Union – like many other parts of the world – is suffering from one of the most severe droughts on record, with nearly two-thirds of its territory in a state of alert or warning[7].

The pandemic and the war are likely to add to instability in the years to come. They challenge two of the fundamental stabilising forces that have contributed to the decline in volatility during the Great Moderation: globalisation and an elastic energy supply. Globalisation acted as a gigantic shock absorber.

The breakup of the Soviet Union and global economic liberalisation from the 1980s onwards led to about half of today's world population being integrated into the global economy.

Labour supply became so abundant, and production capacity so large, that even periods of strong demand rarely succeeded in putting persistent upward pressure on prices and wages[8].

However, even before the pandemic, protectionism and nationalism were on the rise[9]. Tariff and non-tariff barriers

were raised as the benefits of free trade were increasingly being called into question[10].

Today, the world economy is at risk of fracturing into competing security and trade blocs. The international network that connects our economies is fragile. We are witnessing new and alarming forms of protectionism.

Consider health. Although vaccines have been rolled out in advanced economies for nearly two years now, a third of the world population is still unvaccinated. Unequal access to effective COVID-19 vaccines means that ending the pandemic remains elusive.

Food protectionism, meanwhile, is causing misery and social unrest in parts of the world. The number of governments imposing export restrictions on food and fertilizers is close to that recorded during the 2008-2012 food crisis, exacerbating the repercussions of the war on food supply.

Protectionism is going hand-in-hand with a fundamental reappraisal of global value chains. Many critical inputs to our modern societies, such as semiconductor chips, are produced in just a handful of countries. Europe's energy crisis has exposed the deep fragilities of such an economic system.

Efforts to enhance diversification will help secure strategic autonomy and make value chains more robust. But they also imply duplication and inefficiency.

And if used as a form of protectionism, a greater reliance on domestic production may leave countries more – rather than less – vulnerable to shocks in the future[11].

The second stabilising force – an elastic energy supply – will also become less powerful in absorbing shocks in the years to come.

Following the oil price shocks of the 1970s, the distribution of global oil supply changed drastically. OPEC's global market share fell from 53% in 1973 to 28% in 1985 as Mexico, Norway and other countries started producing significant amounts of oil[12].

The 'Shale Revolution' in the United States, which started at the turn of the century, changed the oil market once again. It is estimated to have resulted in a significant increase in the price elasticity of oil and gas supply[13].

As a result, just as globalisation led to excess supply in product and labour markets, limiting price and wage increases, the emergence of the United States as a large net exporter of energy buffered the impact of demand shocks on oil and gas prices over the past 15 years.

The green transition and the war in Ukraine will lastingly make fossil energy scarcer and more expensive at a time when renewable energy carriers are not yet sufficiently scalable. Over the coming months, acute shortages, in particular in Europe, may require painful adjustments to production and consumption.

"Trust in our institutions is even more important at a time of major and disruptive structural change that brings about larger, more persistent and more frequent shocks"

The shift to greener technologies will reduce such pressures over the longer run, but it will also broaden the sources of energy shocks during the transition.

Most green technologies require significant amounts of metals and minerals, such as copper, lithium and cobalt. As their supply is constrained in the short and medium term, and often concentrated in a small number of countries, action to quickly reduce our dependency on fossil energy will lead to firms and governments competing for scarce commodities, thereby pushing up prices[14].

Of course, such fundamental and disruptive changes to the structure of our economies also offer important opportunities.

There is hope that the war in Ukraine unites those who embrace the values of liberty, territorial integrity and democracy. And the determined fight against climate change holds the potential for strong and sustainable growth.

But even then, the challenges we are facing are likely to bring about larger, more frequent and more persistent shocks in the years ahead.

The role of monetary policy

The transition to the Great Volatility is not a pre-determined outcome, however.

If the nature of the shocks changes – that is, if one of the factors that had contributed to the Great Moderation subsides – the other factor – better policies – becomes more important in ensuring macroeconomic stability.

Fiscal policy will play an important role in enhancing the resilience of our economies.

Governments need to adapt their policies to the risk of a protracted period of lower potential output growth. With debt-to-GDP ratios at or close to historical highs, spending should focus on protecting social cohesion and promoting productive and green investments that will help secure long-term prosperity and rebuild fiscal space needed to cushion future shocks.

Monetary policy, in turn, needs to protect price stability. What this means in an environment of elevated volatility and structural change is, however, controversial.

Because monetary policy operates with long lags, price stability is typically defined over the medium term, giving central banks some discretion over the extent and length of inflation overshoots that they are willing to tolerate over the short run.

This discretion is particularly relevant in the case of supply-side shocks that tend to push prices and output in opposite directions. Stabilising inflation is then no longer equivalent to stabilising output – the divine coincidence of monetary policy disappears[15]. Such shocks therefore imply a trade-off for monetary policy, between inflation and output.

The experience of the 1970s suggests that the extent of this trade-off is highly path dependent. A poorly chosen course of action can make attaining price stability significantly more costly in the future.

This path dependency puts a heavy weight on the decisions that central banks are taking in response to the challenges we are facing today.

For the first time in four decades, central banks need to prove how determined they are to protect price stability. The pandemic and the war are consistently suppressing the level of aggregate supply at a time of strong pent-up demand, leading to sharp price pressures across a large range of goods and services.

There are two broad paths central banks can take to deal with current high inflation: one is a path of caution, in line with the view that monetary policy is the wrong medicine to deal with supply shocks[16].

The other path is one of determination. On this path, monetary policy responds more forcefully to the current bout of inflation, even at the risk of lower growth and higher unemployment. This is the 'robust control' approach to monetary policy that minimises the risks of very bad economic outcomes in the future[17].

Three broad observations speak in favour of central banks choosing the latter path: the uncertainty about the persistence of inflation, the threats to central bank credibility and the potential costs of acting too late.

Uncertainty about inflation persistence requires a forceful policy response

The first observation relates to how central banks should act in the current environment of large uncertainty.

William Brainard's well-known attenuation principle suggests that central banks should tread carefully in the face of uncertainty about how their policies are transmitted to the broader economy[18]. There are at least two conceptual cases where the Brainard principle breaks down.

One is the existence of the effective lower bound. The best way for central banks to avoid the perils of a liquidity trap is to ease policy swiftly when a disinflationary shock hits the economy in the vicinity of the lower bound[19]. This principle has become a cornerstone of the monetary policy strategies of many central banks, including the ECB.

The second case is when there is uncertainty about the persistence of inflation.

When the degree of inflation persistence is uncertain, optimal policy prescribes a forceful response to a deviation of inflation from the target to reduce the risks of inflation remaining high for too long[20].

In this case, it is largely irrelevant whether inflation is driven by supply or demand. If a central bank underestimates the persistence of inflation – as most of us have done over the past one-and-a-half years – and if it is slow to adapt its policies as a result, the costs may be substantial[21].

In the current environment, these risks remain significant. Unprecedented pipeline pressures, tight labour markets and the remaining restrictions on aggregate supply threaten to feed an inflationary process that is becoming harder to control the more hesitantly we act on it.

About 20 years ago, here in Jackson Hole, Carl Walsh was clear about what this implies for the conduct of monetary policy: to reduce the risks of a Volcker-type policy shock, central banks should conduct policy assuming that inflation is persistent, as the costs of underestimating persistence are higher than those of overestimating it[22].

Such a policy naturally puts a stronger emphasis on incoming data.

Two sets of indicators matter most for deciding on the policy adjustment required to restore price stability.

One is actual inflation outcomes along the entire pricing chain. These play a more critical role than they would normally do, as they serve as an important reference point for policymakers to evaluate future pipeline pressures, the forces driving inflation persistence and risks of a de-anchoring of inflation expectations.

The other is data on the state of the economy to assess how fast supply and demand imbalances are correcting in response to both changes in interest rates and the repercussions of adverse supply-side shocks.

At the same time, the nature of inflation uncertainty implies that forward guidance on the future path of short-term interest rates becomes less relevant, or that it even risks adding to volatility rather than reducing it.

A key condition for the success of forward guidance in steering expectations over the past decade was a macroeconomic environment characterised by both historically low inflation volatility and the constraints of the effective lower bound.

Forward guidance is less appropriate in conditions of high volatility. When shocks are large and frequent, central banks can give no reliable signal about the future path of short-

term interest rates, other than the broad direction of travel consistent with a reaction function that is calibrated on the assumption of high inflation persistence.

Risks of a de-anchoring of inflation expectations are rising

The second observation tilting the trade-off facing monetary policy towards more forceful action relates to central banks' credibility.

Our currencies are stable because people trust that we will preserve their purchasing power. For politically independent central banks, establishing and maintaining that trust is an important policy objective in and of itself.

Failing to honour this trust may carry large political costs[23]. History is full of examples of high and persistent inflation causing social unrest. Recent events around the world suggest that the current inflation shock is no exception. Sudden and large losses in purchasing power can test even stable democracies.

Surveys suggest that the surge in inflation has started to lower trust in our institutions[24]. Young people, in particular, have no living memory of central banks fighting inflation.

We are witnessing a steady and sustained rise in medium and long-term inflation expectations in parts of the population that risks increasing inflation persistence beyond the initial shock.

In the euro area, consumers' medium-term inflation expectations were firmly anchored at our 2% target throughout the pandemic. According to the most recent data, median expectations are close to 3%, while average expectations have increased from 3% a year ago to almost 5% today[25].

Average long-term inflation expectations of professional forecasters, too, have started to gradually move away from our 2% target. In July, they stood at 2.2%, a historical high.

For both consumers and professional forecasters, we are also observing a marked increase in the right tail of the distribution – that is, the share of survey participants who expect inflation to stabilise at levels well above our 2% target[26]. Option prices in financial markets paint a similar picture[27].

In the 1970s, such shifts in the right tail of the distribution preceded shifts in the mean[28].

We broadly know why these shifts happen among consumers who are financially less literate. These consumers predominately form their expectations based on inflation experiences[29].

But for the euro area, the ECB's consumer expectations survey shows that people who are financially more literate and who see themselves as playing a relevant role in actual price and wage-setting have recently revised their medium-term inflation expectations to a larger extent than other survey participants.

This is a source of concern. Unlike for consumers who form their expectations based on their experience of inflation, the higher inflation expectations of financially literate people are unlikely to subside if and when inflation starts decelerating. This increases the probability of second-round effects.

We cannot say for certain what is behind these upward revisions to inflation expectations. But two potential explanations come to mind. One is that higher medium-term inflation expectations may be the result of a perception that monetary policymakers have reacted too slowly to the current high inflation.

A cardinal principle of optimal policy in a situation of above-target inflation is to raise nominal rates by more than the change in expected inflation – the Taylor principle. If real short-term interest rates fail to increase, monetary policy will be ineffective in dealing with high inflation.

In the United States, a systematic failure to uphold the Taylor principle was one of the key factors contributing to the persistence of inflation in the 1970s[30].

The second explanation is that higher inflation expectations may reflect more fundamental concerns, possibly related to fiscal and financial dominance, or to the recent review of central banks' monetary policy frameworks that focused more on the challenges of too-low inflation rather than too-high inflation[31].

All these factors may have created perceptions of a higher tolerance for inflation and a stronger desire to stabilise output.

Determined action is needed to break these perceptions. If uncertainty about our reaction function is undermining trust in our commitment to securing price stability, a cautious approach to policymaking will no longer be the appropriate course of action.

Instead, a politically independent central bank needs to put less weight on stabilising output than it would when inflation expectations are well anchored.

Policymakers should also not pause at the first sign of a potential turn in inflationary pressures, such as an easing of supply chain disruptions. Rather, they need to signal their strong determination to bring inflation back to target quickly[32].

This is another key lesson of the 1970s. If the public expects central banks to lower their guard in the face of risks to economic growth – that is, if they abandon their fight against inflation prematurely – then we risk seeing a much sharper correction down the road if inflation becomes entrenched.

Central banks are facing a higher sacrifice ratio

The third, and closely related, observation that supports a more forceful policy response relates to the potential costs of acting too late – that is, when high inflation has become fundamentally entrenched in expectations, a situation that neither the United States nor the euro area are facing today.

In the early 1980s, many central banks had to tolerate large and costly increases in unemployment to restore confidence in the nominal anchor. There are at least three reasons to believe that a similar endeavour could be even more costly today in terms of lost output and employment.

One is that our economies have become less interest rate-sensitive over time, meaning that more withdrawal of monetary accommodation would be required for a given desired decline in inflation.

The growing importance of intangible capital is partially responsible for this. In the United States, its share in total investment has tripled since 1980. And in the euro area, it has increased from about 12% in 1995 to 23% today.

Research finds that intangible capital-intensive firms tend to be net savers because intangible capital is more difficult to mobilise as collateral for bank lending, making the cost of credit less important[33].

These effects are reinforced by the structural shift towards services, which tend to be, on average, less responsive to monetary policy than more capital-intensive sectors, such as manufacturing[34].

The second reason why a de-anchoring of inflation expectations has become more costly relates to the slope of the Phillips curve.

There is a wealth of studies that find that the Phillips curve has become flatter over the past few decades[35].

Before the pandemic, a flat Phillips curve meant that central banks could allow the economy to run hot before inflationary pressures would emerge. Today, a flat Phillips curve means that lowering inflation – once it has become entrenched – potentially requires a deep contraction.

The third reason concerns the relevant measure of slack.

Even if the true slope of the Phillips curve were to be steeper than is suggested by reduced-form estimates, the fact that it is often global rather than domestic slack that matters for price-setting reduces the sensitivity of the economy to interest rate changes on a much broader level[36].

The events of the past one-and-a-half years are testimony to the increased relevance of global economic conditions for inflation[37].

In other words, central banks are likely to face a higher sacrifice ratio compared with the 1980s, even if prices were to respond more strongly to changes in domestic economic conditions, as the globalisation of inflation makes it more difficult for central banks to control price pressures.

Conclusion

High inflation has become the dominant concern of citizens in many countries.

Both the likelihood and the cost of current high inflation becoming entrenched in expectations are uncomfortably high. In this environment, central banks need to act forcefully. They need to lean with determination against the risk of people starting to doubt the long-term stability of our fiat currencies.

Regaining and preserving trust requires us to bring inflation back to target quickly. The longer inflation stays high, the greater the risk that the public will lose confidence in our determination and ability to preserve purchasing power.

Trust in our institutions is even more important at a time of major and disruptive structural change that brings about larger, more persistent and more frequent shocks. A reliable nominal anchor eases the transition towards the new equilibrium, and improves the trade-off facing central banks in the future.

All in all, therefore, an important lesson from the Great Moderation is that it is also up to central banks whether the challenges we are facing today will lead to the Great Volatility, or whether the pandemic and the war in Ukraine will ultimately be remembered as painful but temporary interruptions of the Great Moderation. ■

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